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THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

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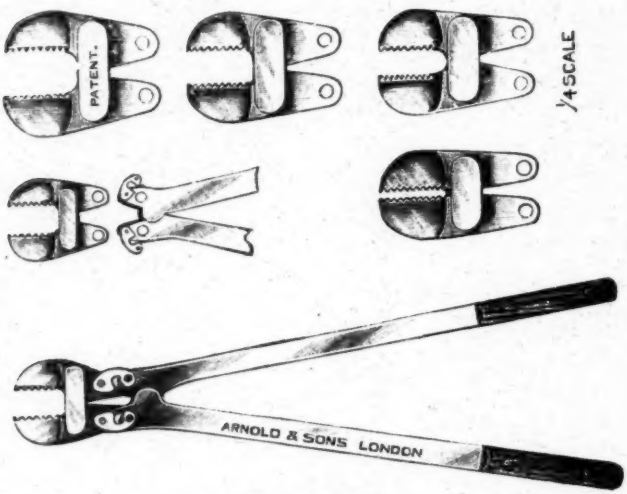

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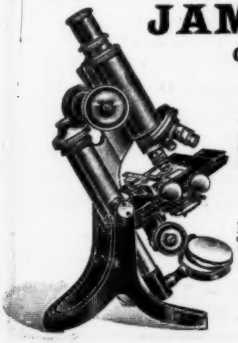

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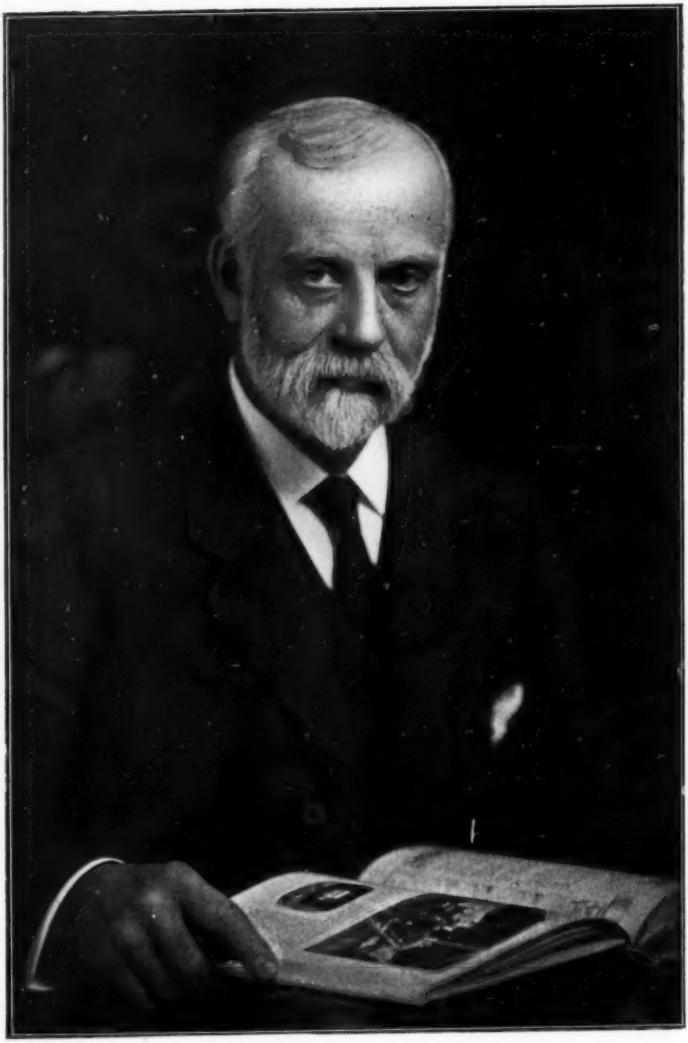


DR. S. BRENTON, V.S.,

President of the American Veterinary Medical Association.

THE

VETERINARY JOURNAL

MAY, 1912.

DR. S. BRENTON.

ONE of the most popular and respected members of our professional colleagues in America, and one whom we hope to welcome in England at no distant date, is Dr. Brenton, of Detroit, Michigan, U.S.A.

Born in Canada of English parents he spent his early years on a farm, from which he imbibed that love of animals which eventually made him become a veterinary surgeon.

Graduating from the Ontario Veterinary College in 1880 he settled down in Michigan almost at once, and his name has become a household word wherever the diseases of stock need to be advised about.

In 1883 the Michigan State Veterinary Medical Association was organized, and Dr. Brenton was one of the original founders. being its first Treasurer, and, in 1885, its President. This year, however, he is an exceptionally proud man, for the American Veterinary Medical Association, at the recent Toronto meeting, selected him to be their President, and in that capacity he holds the pendulum which very largely sways the destiny of the profession in America.

The Association is in good hands, for no one has a better reputation for level-headedness, and we are sure that the ship will give proof at the end of his year of office of having been handled well by its helmsman.

One great wish of Dr. Brenton's is to bring about a closer relationship between the members of the profession in England and America, and at the forthcoming International Veterinary Congress, if not before, there will be an excellent opportunity for this *rapprochement*.

Amongst other things, he is a member of the Michigan Academy of Science, and also of the Detroit Board of Commerce, Secretary and Treasurer of the Michigan State Veterinary Board, and a good Mason.

Editorials.

Indexed U. A. L.

THE ETIOLOGY OF EQUINE INFLUENZA.

THE article by Dr. Ferry on the above subject, which was published in the April issue of THE VETERINARY JOURNAL, is one of very great interest, and is certainly a contribution of importance to the study of the etiology of influenza of the horse. Pathological research, like so many other phases of science, appears to go in waves, and of late so much work appears to have been done in connection with tropical diseases that we are more than pleased to see that attention is being given to one of the most serious of the diseases of the horse. The article in question shows that Dr. Ferry has done an incalculable amount of work on the subject, and even if the tentative conclusion which he has arrived at—namely, that equine influenza is due to a streptococcus—should not prove to be the case, yet his results will be of great assistance to the further investigation of the disease, and they certainly mark a good step forward. We say "tentative conclusion" because the investigator himself says he does not at present "feel justified in stating positively that this streptococcus is the cause of influenza in horses," but he does believe "that the findings, combined with those of other investigators, point very strongly to that conclusion, or at least show the close relationship of this disease to strangles and contagious pneumonia." We commend the caution of Dr. Ferry's conclusion, and we trust he will not object to some criticism, even though his work is by no means yet completed.

As Dr. Ferry is apparently well aware, influenza, strangles, and contagious pneumonia are not infrequently met with under similar conditions and even in the same stables. This is especially true of dealers' stables in large cities. The considerable numbers of horses brought from "goodness knows where" into such stables introduce all kinds of infection, and horses brought from

clean country stables into them become readily infected, even if only there a day or two, and they spread the disease to the stable of the next purchaser. In fact, such stables are just hot-beds of disease. As we have already stated, the three diseases exist under precisely similar conditions, just as do mange and ringworm. That undoubtedly must increase the probability of mixed infection, and in investigating or combating outbreaks it is not at all to be wondered at that sometimes one meets with cases of varying types of disease in different animals in the same stable. That an adult horse suffering from an apparently typical attack of influenza should also be found harbouring on his nasal mucous membrane, and even discharging in considerable numbers, a streptococcus indistinguishable from the streptococcus of strangles is not to be wondered at. That he does not develop strangles abscesses may readily be due to some degree of immunity resulting from an attack of strangles in youth. It has long been recognized that the common form of nasal catarrh of London horses is associated with the presence of streptococci indistinguishable from the streptococcus of strangles, and which can be readily demonstrated in the nasal discharges. We should, therefore, hesitate before regarding as evidence of identity of the two diseases the presence of such a streptococcus in the nasal discharge of a horse suffering from a typical attack of influenza.

Clinical observation is of the greatest importance, and must not be under-estimated. As the result of extensive clinical observation, one is driven irresistibly to the conclusion that there are clear differences between typical cases of the three diseases, and that in such typical cases one could not easily confuse strangles with equine contagious pneumonia or with influenza. In atypical cases, however, there might easily be confusion owing to complications or even to mixed infections.

It is very unfortunate that Dr. Ferry was not able to enforce all precautions against possible contamination in making his blood cultures, for in this very fact we fear his results must be open to doubt. Thirty per cent. of the cases gave no growth, while rather more gave a growth of streptococcus alone, and a similar number gave evidence of mixed cultures. It is not easy to see why Dr. Ferry regards the cultures of streptococci as being the cause of the disease, and not due to accident in

obtaining them, any more than he should have regarded the sterile flasks as evidence that the disease was not due to a blood organism.

Undoubtedly a most interesting claim regarding the organism is that it has passed through Berkefeld filters many times, and sometimes through Chamberland filters. It must, indeed, be very minute at some stage of its life-cycle to behave in a way very different from most known strains of streptococcus. We only know of one similar claim (not yet confirmed, so far as we are aware), and that is by Dr. Siegel, who states that the streptococcus which he regards as the cause of foot-and-mouth disease will also pass through a porcelain filter.

Dr. Ferry's experience in this respect is all the more interesting in view of Dieckerhoff's contention, and Basset's results. The latter has claimed that equine influenza is due to a filterable virus which passed through a Berkefeld V filter, and which caused influenza in a horse three days after inoculation. He, however, regards the organism as invisible.

We congratulate Dr. Ferry on his work, and hope he will continue it and place the etiology of equine influenza on a sound basis, and thus pave the way for a preventive and, perhaps, curative serum. In that case he will be the means of saving numberless horses and earn the gratitude of all horse-owners.

THE ROYAL COMMISSION ON VIVISECTION.

We have found some little difficulty in adequately abstracting the final report of the Royal Commission on Vivisection. Our aim, however, has been to include in the abstract, on p. 275, *et seq.*, a fairly detailed account of the Act which regulates experiments on living animals and its administration, and then to give a summary of the main conclusions arrived at by the Commission after they had heard, and carefully considered, volumes of evidence on all phases of the question. We have retained one portion of the recapitulation of evidence, however, which we thought of special interest to veterinary surgeons relative to anæsthesia, but the bulk is so great that space would not permit of including more of the evidence.

The moral aspect of vivisection is one of great importance,

and is probably responsible for most of the opposition to experimentation on living animals. The views of people who object to it must be respected, even though the majority of us cannot accept them. They are no doubt honestly held and honestly expressed, though we fear the hypersensitiveness of the persons holding them and their enthusiasm for their "cause," frequently prevent their seeing facts as they are. Their mental vision is often somewhat distorted and this results in harrowing descriptions of operations inflicted on animals. Bearing this in mind, the Report says: "After careful consideration we have come to the conclusion that the witnesses have either misapprehended or inaccurately described the facts of the experiments," and "To represent that animals subjected to experiments in this country are wantonly tortured would, in our opinion, be absolutely false." Such a pronouncement is very gratifying, and should go far towards allaying the fears of those of us who have the welfare of our dumb friends at heart. The sincerity of antivivisectors was testified to by numerous witnesses, one even going so far as to assert that he "would not have one mouse painfully vivisected to save the greatest of human beings nor the life dearest to me." If it was possible to get painless vivisection he would not disapprove of it. Some views held are undoubtedly due to gross ignorance, one witness having given the opinion that it is *impossible to anæsthetise a dog*. In summing up the moral aspect the commissioners report that "experiments upon animals, adequately safeguarded by law, faithfully administered, are morally justifiable and should not be prohibited by law."

It is to the practical results obtained from vivisection, however, that one must turn to decide if it is justifiable. They are indeed many, and have enormously enhanced our ability to remove and relieve pain and suffering in the human subject and in the lower animals. The Report reminds us that Lord Lister stated to the previous Royal Commission that he could not have made his way in the subject of antiseptics without the assistance he had derived from experiments on the lower animals; while the President of the Royal College of Surgeons well stated what we are fully cognizant of, namely: "Many operations that used to be looked upon as too dangerous to be undertaken except under stress of necessity or as offering a last chance of saving life are now performed with safety; many

new and important ones, which were formerly never dreamed of, have now become matters of successful and almost daily performance. Finally, whereas the mortality, even after quite simple operations, was at one time so appalling that patients were often deterred from submitting to, and the surgeon from performing them, operations of considerable magnitude are now undergone with the confidence which comes from knowing that the mortality is, in many instances, but a fraction of a unit per cent." That in itself is eloquent testimony, and the truth of it is being proved by all of us daily. But it is not all by any means. Numerous most useful drugs, such as chloral, cocaine, antipyrin, phenacetin, physostigmin, amyl nitrite, caffein, and urotropin, have been introduced as the result of animal experimentation, to mention a few whose excellence and usefulness cannot be contradicted.

Another point of importance to which the Report draws attention is that the term "vivisection" is often applied to all experiments on living animals, and so includes hypodermic injections, simple inoculations, &c. Consequently there is a very misleading impression produced when the total number of experiments in any year is quoted without indicating the nature of the experiments. For example, in 1910 about 95 per cent. of the total number of experiments were of such a nature, while the remaining 5 per cent. include the "cutting" experiments, and in more than half of these cases the animal was "kept under the influence of an anæsthetic from before the beginning of the experiment until it was killed."

With regard to the recommendations of the Royal Commission, one of the most important is that referring to the inspectorate. At present there are two inspectors for Great Britain and one for Ireland. They are not required to give their whole time to the duties of their office. The Royal Commission recommends that there should be a considerable increase, and that there should be four whole-time inspectors for Great Britain alone, or a sufficient number of part-time inspectors who could give such time as would be equivalent to the services of four whole-time men. We certainly think the former would be the better alternative, and that it would be better for an inspector not to be in active practice of his profession. The recommendation further suggests that: "It

is essential that the inspectors should be qualified medical men of such position as to secure the confidence both of their own profession and of the public."

We are of opinion that at least two veterinary surgeons should be included in the inspectorate, as so many experiments are conducted on their legitimate patients, and so many are in special reference to research concerning diseases, &c., of the domesticated animals. It would not be difficult to obtain men of sufficient ability and standing to be able to carry out the duties quite amicably with medical colleagues and to command the confidence of the public.

General Articles.

THE NASO-PALATINE APERTURES, JACOBSON'S ORGAN, AND STENSON'S CANAL.

(*Continued from p.* 206.)

Indexed B. A. L.

By THOS. B. GOODALL. F.R.C.V.S., F.L.S.
Christchurch, Hants.

(*Formerly Examiner in Anatomy to the Royal College of Veterinary Surgeons.*)

DEER.

The Fallow Deer (*Cervus Dama*).—The anterior naso-palatine aperture is nearly ovoid, being straight only on its inner margin. The pre-maxillary bones do not meet on their inner margins.

In the fallow-deer the aperture is 1¼ in. long and 7-16 in. wide. Relatively the aperture is larger in the cervidæ than in either the ovidæ or bovidæ; it is especially large in the little roe-deer (*Capreolus caprea*), in which animal the apertures are so large that, practically, there is no bony separation between the nose and the mouth at the anterior part of the palate, except a narrow rim of bone round the apertures.

In the *Roe-deer* the dimensions are 1¼in. long and 5-16 in. wide. It is ovoid, as in the fallow-deer. It is very large in all the cervidæ, especially so in the wapiti. (After a visit to South Kensington Museum.)

Fallow-deer.—Palate: All the bars are discontinuous at the centre of the palate, where they curve backwards and form a channel.

There are fifteen bars on the right side, including the first, which forms the base of the dental pad; the sixth is partly rudimentary, and joins the fifth at about its centre. On the left side there are fourteen bars.

In the space of the diastæma, *i.e.*, between the dental pad and the molars, there are eleven bars on the right side and ten on the left, and these all show a number of papillæ on their edges, which are directed backwards. The first five pairs are close together and narrow, with papillæ between them, especially pronounced between the first and second; the sixth, seventh, and eighth are broader, the ninth and tenth rather narrower. the eleventh and twelfth are broader, and from this backwards they gradually lose their character as bars and become lost in the lines of the corrugations of the soft palate.

There are no papillæ on the hinder bars between the molar teeth. The soft palate is studded with the openings of glands. All the inner sides of the lips and cheeks, and also the frænum of the tongue, are covered by large papillæ.

The dental pad is $\frac{7}{8}$ in. across its centre in an antero-posterior direction, and almost straight across its posterior border; it has a number of hardened tesselated epithelial eminences on the anterior half of its face. The first pair of bars, which form its base, curve sharply backwards at the centre, and the space between them forms a channel leading to the gustatory pad.

The gustatory pad, situated in the centre of the dental pad, is $\frac{1}{2}$ in. across; it is hard, but springy, and is continuous with the dental pad in front, but behind it is separated from the pad by a deep channel on either side, which, converging as they proceed backwards, meet at the centre, where they join the central channel formed by the bending back of the first pair of bars.

The openings of Stenson's canal, through which a probe may easily be passed, are situated one on either side of the gustatory pad, at the bottoms of the anterior points of these channels.

Stenson's canal takes an upward and backward course through the anterior naso-palatine aperture to the narial opening at the anterior part of the floor of lower nasal meatus.

Jacobson's organ takes a somewhat remarkable course. It opens into Stenson's canal on its anterior margin, about $\frac{1}{4}$ in.

from its palatal opening; it then passes over the back of that canal at almost a right angle, and then passes back through the anterior naso-palatine apertures in the usual way, to form the base of a very marked flange at the antero-inferior part of the septum nasi.

There is a little erectile tissue under the palate, from the fourth to the last bars; there is none at the anterior part of the palate, or round the anterior naso-palatine apertures. The palatine nerve and its branches are greatly developed.

The hard dorsum of the tongue, as in all herbivora, is very pronounced, and is covered with horny or hard, sharp papillæ; between the dorsum and the anterior part of the tongue, which is smooth, there is a marked, deep, transverse channel.

Under the skin, in the region directly above the muffle and between the skin and the alæ of the cartilages, is a smooth synovial, or semi-synovial, patch, about 1½ in. across, allowing free movement of the skin and muffle over the alæ. This would be useful in searching for palatable food, and for other purposes. I might note, in passing, that the levator labii alæque nasi muscle is particularly developed and very tendinous.

The antero-inferior part of the septum nasi becomes firmly attached in the inter-premaxillary space, and just above this, ½ in. back from the anterior edge of the dental pad, a pair of alæ are reflected from the anterior margin of the septum, curving first a little forward and then down and backwards, and they become intimately blended with the fibro-cartilaginous material forming the basement of the floors of the anterior part of the nostrils.

There is a considerable space between the anterior part of these alæ and the dental pad, which is filled in with fibrous and muscular tissues. These lower alæ are movable on the fixed septum.

On its upper part the septum nasi folds over on either side to form the upper lining of the nasal chambers (this is common to all mammals) in front of the nasal bones. These reflections are continued forward, as a rigid dome on either side, and these are movable on the nasal bones. The superior alæ, which are freely mobile, are reflected from the anterior part of these domes, and become intimately blended with the appendices of the maxillary turbinated bones.

There is a very marked bulging of the flange of the septum at its anterior part, where it is overlapped by the anterior part of maxillary turbinated bone, and they, together, form a roof to the marked canal at the floor of the nostril, leading to the opening of Stenson's canal and Jacobson's organ.

Erectile tissue covers all these reflections of cartilages, &c., at the anterior part of the nares; and the mucous membrane in all this region, extending from an inch and a half to two inches or more, along the walls of the anterior nares—that is, one might say, all those parts of the nares lined by the reflections of the septum—has a very distinctly villous epithelium. This is reflected not only over the septum and alæ, but also over the anterior part of the maxillary turbinated bone, and over the flange of the septum to as far back as the flange is in evidence. It is especially marked round the nasal opening to Stenson's canal and Jacobson's organ.

The lachrymal duct opens on to the outer side of the anterior margin of the nares, between the appendix of the maxillary turbinated bone and the floor of the nasal chamber.

The cartilage of elongation of the maxillary turbinated bone bends upwards at its anterior part, and blends with, and becomes one with, the widened cartilage of the superior alæ of the nostril.

As in the horse and dog and other animals, the nasal branch of the ophthalmic nerve, passing under the roof of the nostril to the anterior nares, is very large.

In the *Giraffe* (*Giraffa camelopardalis*) the anterior naso-palatine apertures are seen on the bony palate as two elongated, narrow slits, one on either side.

In the *Eland* (*Orcas canna*) the apertures are smaller than in the oxen or deer, and in the *Kudu* and antelopes generally, they are not so large as in the cervidæ and bovidæ proper; in the *Sable Antelope* they are rather larger.

In the *Llama* (*Auchenia glama*) there is a rather large anterior naso-palatine aperture on either side, and from the anterior extremity of the opening in the palate there is a bony canal, which is directed forward. There is also a large heart-shaped incisive opening at the anterior part of the palate.

The *Camel* (*Camelus*) has a small elliptical anterior naso-palatine aperture on either side, situated at the part of the palate corresponding to the space between the canine tooth and the

last incisor; a smooth groove is continued in a forward direction from each aperture.

There is no naso-palatine aperture in the *Elephant*; the trunk is capable of doing all the tasting and testing.

The *Bushbuck* (*Tragelaphus sylvaticus*).—The dental pad is semilunar in shape, interrupted in the centre by a raphe, which is continued up the centre of the muffle.

The gustatory pad is somewhat diamond-shaped, divided from the dental pad by deep fissures, which are continuous with the central raphe of the muffle.

The oral openings of Stenson's canal are in the bottoms of these fissures, and at the lateral angles of the gustatory pad.

There are fourteen pairs of bars, which are interrupted at the centre of the palate. The first twelve pairs are between the dental pad and the first premolars; behind these there are two imperfect pairs, and behind this, again, except for the presence of papillæ, the palate is smooth. The first two pairs of bars are broken and interrupted. The posterior edges of the bars, from the second to the ninth, are fringed with papillæ. Numerous papillæ are seen on the inner sides of the lips and cheeks.

The *Oribi* (*Ourebia scoparia*).—There are fourteen bars. The first seven are discontinuous at the centre of the palate; there are small papillæ on the edges of the bars only. The dental pad is large. The gustatory pad is triangular, surrounded by a groove with raised edges; these extend in front to form a groove leading to the centre of the muffle. The bars extend as far back as the third premolars.

Sus—Pig.

The anterior naso-palatine apertures are situated between the interdental spaces of the second and third incisors, and they are bounded entirely by the premaxillary bones, except the small posterior boundary by the palatal process of the maxillary. They are about $\frac{5}{8}$ in. long and 3-16 in. wide, somewhat ovoid in shape. The front part is smooth and rounded, and there is another smooth ledge of bone surrounding the outer margins; these lead to a smooth fossa immediately behind the central and between the second incisors.

The premaxillæ do not quite meet, leaving a slit-like space, centrally situated, between them; the septum nasi is lodged in this space.

The palatal processes of the maxillary bones show seven transverse ridges and grooves, corresponding to the bars of the palate, and extending from the canines to the second premolars. On the narial side the body of the premaxillary bone rises abruptly in front of the aperture.

The section of the muzzle was made just behind the canine teeth. The "sacs" of the young permanent canines were so intimately connected with their alveoli, and the apex of the sac with the buccal membrane, that it was necessary to cut off a piece of the latter from the gum to get the sac intact, and then the sac could scarcely be separated from the alveolus without

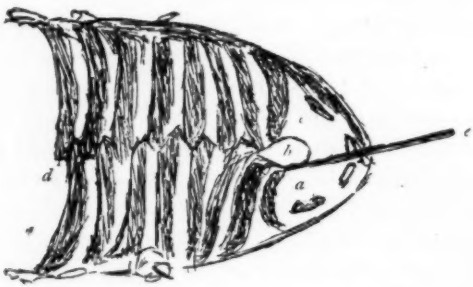


FIG. 5.—Front part of palate of a 4 months' old pig, showing dental and gustatory pads. Probe passed into Stenson's canal. *a*, opening of Stenson's canal; *b*, gustatory pad; *c*, dental pad; *d*, bars; *e*, probe.

injury; in fact, vascular processes go from the sac into the bone. The permanent canine is situated above the first premolar, and its sac's attachment to the gum is just in front of that tooth.

Palate.—The dental pad of a four-months-old pig is raised to the level of the incisors. A band of buccal membrane passes from its anterior border between the central incisors, and is seen as a thickened tubercle on the anterior part of the gum. Its posterior edge curves off on either side to well behind the incisors; it occupies the space behind and between the incisors.

The gustatory pad is pear-shaped, centrally situated in the dental pad, from which it is divided on either side by a deep fissure, in which are situated the buccal openings of Stenson's canal. It is between and behind the lateral incisors.

The bars are close together, and very distinct; they are

interrupted at the centre of the palate, where their ends lap over each other, the end of the bar of one side fitting into the space between two bars of the opposite side. The first pair embrace the pointed posterior extremity of the gustatory pad, and assist in forming the fissure between that and the dental pad. The first nine pairs are large—that is, to the third premolar; from here backwards they gradually become smaller, and curve back at their centres to behind the second molars, and from here to the soft palate they lose their character as bars and diminish in size, the last three or four being mere rugæ.

In a four-months-old pig there are altogether twenty bars; in a nine-months-old one there are twenty-three bars.

The walls of Stenson's canal are cartilaginous, and a little on its inner, upper, and central aspect is the opening of Jacobson's organ, which can be followed by the insertion of a small probe under the pituitary membrane on the lower part of the septum nasi. It is lined by a vascular mucous membrane, a reflection of the pituitary membrane, which is continued into Jacobson's organ.

Stenson's canal, with Jacobson's organ, passes through the anterior naso-palatine aperture at its anterior margin, going obliquely backwards to the floor of the nostril and almost filling the aperture.

The palatine artery and nerve pass through the aperture at its posterior margin.

Stenson's canal opens directly into the mouth in the fissure between the dental and gustatory pad, one on either side; a probe can be easily inserted into the opening.

There are large papillæ distributed profusely over the edges of the upper lip and the "muffle" or nasal pad.

The anterior extremity of the septum nasi bifurcates laterally, forming a bi-lobed semi-osseous mass, reflected backwards on either side to the floors of the nostrils, and forming the basement for the attachment of the muscles of the nose and lips.

The cartilaginous appendices of the maxillary turbinated bones extend to the openings of the anterior nares.

A fibrous band proceeds backwards from the reflected wing of the septum nasi, and forms the roof of the meatus of Stenson's canal and Jacobson's organ.

A reflection from the upper margin of the septum is very

thick, and, in front of the nasal bones, forms a thick basement for the cavity of the nostril.

There is erectile tissue on the septum towards its extremity, on its upper margin, under the nasal bones and cartilage.

Proceeding from the nasal opening of Stenson's canal in a forward direction, to the anterior nares, is a very distinct groove in the septum.

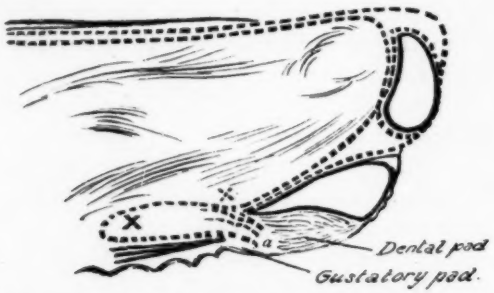


FIG. 6.—Longitudinal and vertical section of the anterior part of the nose of Sus, made as close to the septum as possible. The light cross shows the position of the nasal opening of Stenson's canal, and the dark cross indicates Jacobson's organ. Dotted lines represent cartilage; dark black, bone; light shading, soft tissues. *a*, opening of Stenson's canal.

Another groove in the septum leads from the anterior nares to the middle meatus. The ridge dividing these two grooves fits into a channel between the anterior appendices of the maxillary turbinated bones.

There is a most distinct and independent meatus or groove at the floor of the anterior part of the nostril leading to or from Stenson's canal and Jacobson's organ.

From a section of the pig's nose, a trifle on one side of the median line, I am able to describe exactly the disposition of the cartilages at the anterior part of the nares in their connection with Stenson's canal and Jacobson's organ.

The upper part of the septum nasi terminates anteriorly by a vertical as well as a lateral bifurcation; the processes of the former encircle the upper portion of the os rostri.

The lower edge of the septum is firmly wedged between the premaxillæ, and forms a dense, triangular, semi-osseous, cartilaginous mass between the upper part of the premaxillæ and the os rostri; a reflection is sent back from here which goes to form the anterior wall of Stenson's canal.

Just at the anterior naso-palatine aperture a heel process is given off from the septum nasi, which, folding over the vomer, forms the wall of Jacobson's organ posteriorly, and anteriorly it dips down through the aperture, which it fills, and, blending with the reflected anterior part, it forms the posterior part of the comparatively thick cartilaginous tube of Stenson's canal. (See fig. 6.)

Hippopotamus amphibius.—A groove on either side of the floor of the nasal chamber leads to a separate smooth, round anterior naso-palatine aperture on either side of the palate. After its entry into the palate a bony groove proceeds from it in a forward direction to behind the incisors.

Where it passes through the palate another canal is seen going from it posteriorly between the nasal and palatal plates of the maxillary bone.

The aperture is situated at a point corresponding to the space between the third incisor and the canine teeth.

There is an elliptical centrally placed incisive foramen.

(*To be continued.*)

Clinical Articles.

AN EXCEPTIONAL CASE OF LACERATION OF THE MUCOUS MEMBRANE OF THE TRACHEA IN A HORSE.

By R. EAGLESHAM, M.R.C.V.S.

Paddington, W.

The subject was a five-year-old black van gelding, which was bought in the country on October 26, 1911, and sent to London the same day. The next day it was tried for its wind and found to be sound. On October 30 and 31 it was worked for two short trials and was reported to be a good worker, nothing being noticed amiss.

On November 1 it was found to be sick and was admitted to the infirmary for treatment.

Symptoms.—For the first three days feverish symptoms were shown. On the fourth day the temperature rose to 107° F.,

pulse 90, a suppressed cough was observable, and a slight noise was heard, which appeared to be laryngeal or from upper part of trachea. Auscultation of thorax revealed sounds of broncho-pneumonia.

For the following three days the horse showed some improvement with lowering of temperature to 104° F., pulse 65, and was feeding better.

On November 9 it became worse, temperature rose to 105° F., pulse 72, and the respirations were very quick, with dyspnœa. A peculiar vibrating, sonorous, thumping sound could now be heard in the trachea. The dyspnœa grew gradually worse, and on the evening of the ninth day the noise in the trachea could be heard 30 yards away, and as there was danger of suffocation

FIG. 1.—Section of trachea showing the septum as found on *post-mortem* examination.

I performed tracheotomy on the tenth day to see if it would give relief. On inserting the finger through the tube opening made in the trachea a membrane could be felt which was being firmly pressed downwards, almost blocking the lumen of the wind-pipe. The tracheotomy tube was inserted, but had to be withdrawn immediately as it only made the breathing worse.

On November 13 the breathing became easier, and it now commenced to breathe through the opening made in the wind-pipe. Diuresis set in and a slight discharge from both nostrils was noticeable, first of a catarrhal kind, after which it became muco-purulent. The horse was now in a very weak and exhausted condition, with quick, weak, irregular pulse; became worn out and died the fourteenth day from the commencement of the illness.

Treatment.—In early stages, febrifuges, later carbonate of ammonia, camphor and nux vomica were given in bolus. Hot cloths to sides and oxygen inhalations gave temporary relief.

Post-mortem.—The trachea was found divided throughout its entire length, from larynx almost to the branching of the right and left bronchi, by a transverse septum formed by the mucous membrane on the posterior or upper part of the tube being torn from the fibro-elastic membrane and forced downwards. The septum in the lower part of the trachea was still complete; in the upper part it had ruptured longtitudinally in the middle line to just below the seat of the tracheotomy operation.

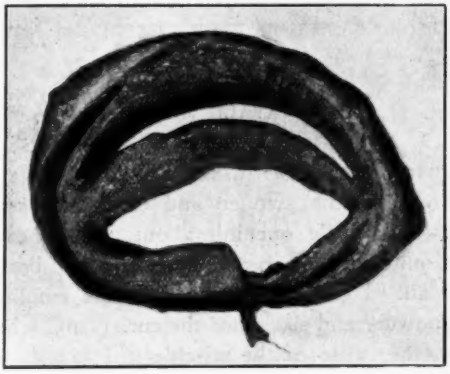


FIG. 2.—Section of trachea showing septum fixed back in position.

The mucous lining of the trachea and bronchial tubes was intensely red and inflamed, and that part forming the septum much thickened.

Three-fourths of the right lung and one-third of the left was pneumonic and very much consolidated. The anterior portions of the lungs were only affected, and septic changes had commenced to take place in the lung tissue.

Remarks.—Although inquiries failed to discover that the horse had met with an accident, and there were no external marks of injury on the neck, I am of opinion that it must have met with an injury through coming in contact violently with something, causing injury to the mucous membrane in the upper part of the trachea. Laceration of the membrane and tearing of it from the fibro-elastic membrane led to the formation of a pocket or *cul-de-sac*,

into which the air rushed, which, with inflammatory changes and spasm of the tube, led to the gradual tearing up of the membrane and its being forced downwards, blocking the lumen of the tube and leading to distressed breathing. The relief in the breathing of the thirteenth day was, I think, due to the rupture of the septum longitudinally from larynx to just below the seat of the tracheotomy operation when breathing commenced through the opening made in the wind-pipe.

The septic condition of the lungs was no doubt due to infection from trachea.

The accompanying photographs will show the septum complete.

STRANGLES IN A COB.

By G. MAYALL, M.R.C.V.S.
Bolton.

On February 20 I was asked to look at a bay cob's jaw, which had become swollen and excoriated and was discharging pus at a little opening about 2 in. above the chin. The pus was quite superficial, and squeezing and bathing seemed to remove it all. I gave the attendant some emollient liniment and laxative powder and slackened the curb chain, which appeared to have been the cause of the mischief. I saw the mare again about a week later, when she seemed to be all right, but there was some thickening of the branches of the lower jaw, due to periostitis and, perhaps, some ostitis, and a slight discharge of ropy saliva from the mouth.

On March 21 I was again asked to see the subject, as she was not eating well. Some tonic medicine was prescribed and she went on satisfactorily until March 25, when I was asked to see her in the stable, she never having been off work up to this time. On examination I found the whole surface of the skin covered with punctiform elevations. Laxative, cooling medicine and diet were prescribed.

On March 26 there was a distinct enlargement in the intermaxillary space, the spots had vanished; the mare came into the infirmary and a blister was applied to the swelling.

On March 28 the swelling was much larger and a good exploratory puncture was made, but no pus discovered. On

March 29 one of Parke, Davis's streptococcus vaccine tablets was injected (according to directions, and with due antiseptic precautions both as regards syringe and the patient's skin) half-way down the neck. On March 31 an inter-maxillary abscess had matured well and about half a pint of pus was let out of the cavity. By bathing the part daily with warm antiseptic solution and squeezing, the mare has gone on well and no complications appear to have occurred. In this case I think the employment of the vaccine hastened the maturation and clearing up of the abscess. The temperature of the mare on March 28 was 105° F. On March 31 it was 101° F., and she was eating well.

I have had cases in the dog of a streptococcic or necro-bacillary nature in which I should have liked to try the vaccine, but not finding anything about the dosage for this animal I have been chary in the matter.

PARALYSIS OF THE LARGE INTESTINES WITH PASSIVE IMPACTION.

By J. WILLETT, M.R.C.V.S.
Harley Place, London, W.

History.—A bay van gelding, 5 years. A new purchase that had been treated by the owner during the previous fortnight for the usual cold and sore throat, but owing to the animal not having passed any fæces for six days began to be alarmed, and called me in on July 12, 1910. On inquiry as to the medicine given, I found the animal had been having the following mixture twice daily during the previous ten days:—

℞	Spirits ether nit.	ʒi
	Tinct. opii	ʒss
	Tinct. belladonnæ	ʒss
	Aquæ q.s.	

and the day previous Oi Ol. lini. to try and relieve the bowels.

Symptoms.—When first seen, before examination was made, the animal appeared comfortable, coat glossy, pain entirely absent, and was eating. On examination, pulse 50, temperature 99.2° F., conjunctiva slightly bilious, respirations not accelerated, total absence of peristalis, rectum empty and dry, but not dilated; colon distended with hard mass of fæces, ears and extremities slightly colder than normal.

Treatment.—Aloetic purgative with diffusible stimulants, oatmeal gruel, bandages to limbs, soapy water clysters every three hours. *No result.*

July 13.—Ol. lini. Oi with stimulants and clysters as previous day. (I may here say that stimulants were given three times a day and with frequent clysters throughout the treatment.) *No result.*

July 14.—No result during night. No peristalsis; rectum empty. Gave hypo. inject. eserine gr i, which caused uneasiness in about twenty minutes, passing off in about an hour.

Result.—During day two small pellets of fæces found in rectum.

July 15.—No result during night. Gave barium chloride 3i per os, scraping of the forefoot followed and general uneasiness, then animal laid down, and in that position passed about a double handful of hard, dry fæces. *No further result during day.*

July 16.—As previous day. Pulse weaker, rather depressed. Gave ol. lini. Oi. *No result.*

July 17.—No passage; absence of peristalsis. Gave strychnine gr. iss twice during day. *No result.*

July 18.—As previous day. Cheerful, wanting to eat straw (ordered muzzle), losing condition, but not so much as might be supposed. Hypo. inject. eserine gr. i.

Result.—Expulsion of a few small pellets of fæces.

July 19.—No further result. Rectum empty. Gave barium chloride 3i; usual symptoms of pain for a short period, followed by evacuation of same amount as previous day, in about two hours.

July 20.—No further result. Gave strychnine gr.ss twice during day.

Result.—Slight peristalsis, but no evacuation.

July 21.—Nothing passed during night. Gave barium chloride 3i, with usual result. Pulse weak, rapidly losing condition. The barium was continued once daily, with small results until the morning of the 25th, when a fair quantity of fæces was passed in a recumbent position.

July 26.—Nothing passed during night. Barium given as before.

Result.—One good motion during day.

July 27.—No result during night, but return of peristalsis, and after a further dose of barium, during the day, the animal showed a considerable amount of pain, but passed a large quantity of fæces, and from this time onwards made a slow but uninterrupted recovery.

Remarks.—The points of interest are: The comparative freedom from pain during the illness, except when eserine or barium were given (the latter causing the lesser constitutional disturbance); the prolonged use of the opium or belladonna no doubt in arresting the secretions caused the ingesta to become dry and hard and predisposing the impaction; the absence of any ill-effects from the frequent use of barium chloride. It may be that larger doses might have effected a speedier cure, but on the other hand it might have caused rupture.

CASE OF TETANUS IN MARE TREATED WITH ANTI-TETANIC SERUM AND HYPODERMIC INJECTIONS OF MAGNESIUM SULPHATE.—RECOVERY.

By GEORGE HESLOP, L.V.Sc.(Melb. Univ.).
Powlett River, Victoria.

Indexed B. A. I.

Some time ago, in the *Lancet*, I saw a report on the uses of magnesium sulphate in tetanus in the human being and decided to give the treatment a trial. This is the first chance I have had since reading the article.

The recovery in this case was very rapid, although at one time the symptoms were quite typical of tetanus in its most severe form.

One noticeable feature throughout was the great alteration in the frequency, force, and duration of the muscular spasms. They were never very frequent and never of very long duration. I attribute this fact (whether rightly or wrongly remains to be proved) to the free use of the magnesium sulphate solutions.

Subject.—Bay Clydesdale mare; 4 years; used for farm work and running in a paddock on the farm.

History.—The animal was found one morning caught by the fetlock (*near fore*) in some barbed wire which had tangled around the fetlock and lacerated the skin rather badly, but had not done any great damage to the deeper structures. The owner

removed the wire and treated the wound with an ointment consisting of Stockholm tar, alum and lard. After a day or so the wound commenced to suppurate freely and became very soiled by contact with the stable bedding and manure. After twelve days of the owner's treatment the horse was brought into the hospital for treatment as the owner did not like the amount of suppuration that was occurring in the wound.

Treatment.—I took the horse into the hospital as an in-patient and cleaned up the wound with ether soap (Felton, Grimwade and Co.) to dissolve out the grease, and afterwards with methylated spirits to remove the tar. This rendered the wound clean on the outside. It was then syringed out with solution of hydrarg. pot. iodide (1-1,000) and a dry dressing of zinc iodide, boracic acid and iodoform dusted into the wound, the whole being covered by a gauze pack and calico bandage.

Next morning I went to dress the wound and had occasion to make the horse "stand over" in his box when I noticed undue prominence of the membrana nictitans, with slight twitching of the muscles on the side of the neck. There was no trismus apparent at this stage. Suspecting tetanus, I rang up the owner, and he told me to use any curative measures I thought fit and not to stop at expense if there was any chance of saving the animal.

I immediately gave 60 c.c. of anti-tetanic serum (Parke, Davis and Co.) intravenously and injected hypodermically on the other side of the neck 1½ oz. of 15 per cent. sterile magnesium sulphate solution. I also gave rectal injections of chloral hydrate, giving 2 oz. of chloral hydrate daily. The anti-tetanic serum and the magnesium sulphate were repeated six hours later, by which time trismus and opisthotonos were prominent symptoms. There was rapid breathing and profuse perspiration; in fact, all the symptoms of a typical case of tetanus.

Second Day.—Gave 60 c.c. anti-tetanic serum intravenously and 1½ oz. 15 per cent. sterile magnesium sulphate solution hypodermically. The box had been darkened on the previous day, and orders were given to prevent any noise in the vicinity of the box which might be sufficient to start the animal into having a series of muscular spasms. Special attention was paid to the wound. On the previous day it had been well opened up and irrigated with neat hydrogen peroxide (Parke, Davis and Co.'s), but I considered it advisable to reduce the strength of the peroxide and only used 50 per cent. solutions in subsequent

irrigations of the wound. Six hours after the serum, &c., had been given in the morning, 1½ oz. of sterile magnesium sulphate solution (15 per cent.) were given alone, as I had run out of anti-tetanic serum and could not get any more until the evening. The muscular spasms which were freely noticeable in the morning were now considerably fewer, respiration easier, and the cervical muscles somewhat softer on palpation, but trismus was still very pronounced.

In the evening gave 60 c.c. anti-tetanic serum with 1½ oz. sterile magnesium sulphate solution (15 per cent.). By this time the neck, on the side I was injecting the magnesium sulphate, was marked by a number of large lumps which, however, gradually decreased in size as the case proceeded. The spasms were now almost *nil*, although the slightest excitement would produce them. Trismus was still very pronounced, but there was no tenesmus, the bowels moving freely. Rectal injections containing 2 oz. of chloral hydrate in barley water were given during the day.

Third Day.—In morning gave 60 c.c. serum with 1½ oz. magnesium sulphate solution (10 per cent.) I tried the weaker solution of magnesium sulphate, to see if there would be any swelling at the site of injection, as was the case with the stronger (15 per cent.) solutions. The result was the same. In the afternoon the same sized doses of serum and magnesium sulphate solution (10 per cent.) were given as in the morning. Rectal injections of chloral, &c., as on the previous day. The animal looked considerably better, and tried to neigh when I entered the box.

Fourth Day.—In the morning gave a reduced dose of serum (40 c.c.) and 1 oz. of magnesium sulphate solution (10 per cent.). Animal was just about same as on previous evening. The muscular spasms were considerably fewer, those occurring being of small force and of short duration. In afternoon gave 40 c.c. serum and 1 oz. magnesium sulphate solution (10 per cent.).

Fifth Day.—In morning gave 40 c.c. serum and 1 oz. magnesium sulphate solution. The top door of the box was left open by a mistake and was forcibly closed by the wind. This accident was sufficient to produce a series of violent muscular spasms. In evening gave 40 c.c. serum and 2 oz. magnesium sulphate solution (10 per cent.).

Sixth Day.—Gave 40 c.c. serum and 1½ oz. magnesium sulphate solution (10 per cent.). Animal was now showing signs

of rapid improvement, and was inclined to move about in the box. The muscular spasms were practically *nil.* In afternoon gave 40 c.c. serum and 1 oz. magnesium sulphate solution (10 per cent.). Stopped the injections of chloral hydrate.

Seventh Day.—In morning gave 40 c.c. serum and 1 oz. magnesium sulphate solution (10 per cent.). Animal very much improved. Signs of the jaws "unlocking." In afternoon gave 30 c.c. serum intravenously, but did not give any magnesium sulphate solution. Slight movement of jaws. No sign of muscular spasms as previously shown. Animal was able to eat a small quantity of mash made very wet. At first there was some difficulty in swallowing, but swallowing gradually became better.

Eighth Day.—Trismus only slight. Animal able to eat wet mash and small quantity of green clover. Gave 30 c.c. serum as final dose.

Ninth Day.—Animal eating green clover greedily. Stopped the injections of serum.

From this time the treatment was stopped and the animal made an uneventful recovery. A small abscess developed on the side of the neck on the site of one of the magnesium sulphate injections, but it was not very troublesome, and readily healed without leaving much of a scar. It was in all probability due to inefficient sterilization of the syringe or the solution.

Throughout the treatment the most noticeable feature was the almost entire absence of muscular spasms, which I attribute to the free use of the magnesium sulphate injections. After injecting the magnesium sulphate into the neck a large swelling (which did not appear to be very hot or very painful) would appear at the site of injection, but this usually reduced itself in twenty-four hours.

The horse was able to leave the hospital three days after the cessation of symptoms, and at the present time does not appear to be very much the worse for its serious illness.

[Dr. Stapley, by whom this communication was originally received, makes the following note: "Swelling from subcutaneous injection of solution of magnesium sulphate is due to the use of hypertonic solutions. In such cases the 'pull' of osmosis is towards the solution, and wheals result, accompanied by slow absorption and tissue destruction. Solutions for subcutaneous, intravenous or subarachnoid injection should be isotonic."—Ed.]

A CASE OF TRUE HÆMORRHOIDS IN A HORSE.

By FREDERICK HOBDAY, F.R.C.V.S., AND GUY SUTTON, F.R.C.V.S.
Kensington, W.

ALTHOUGH occasionally met with in canine patients, this condition is so rare in the horse that the following case is of exceptional interest.

The subject was a valuable carriage gelding about 13 years old, the property of a gentleman in whose possession the animal had been for about seven years. For the past five months the coachman had noticed a little irritation of the rectum after defæcation, and during the past six weeks it had become much more marked. At the time when we were called in, whenever an action of the bowels took place whilst the horse was being driven in the carriage, a large and objectionable swelling of the size of an ordinary orange protruded for some few minutes, and the horse showed evidence of pain. At times, afterwards, the orifice of the anus was blood-stained. An examination revealed the presence of a large cluster of much-congested and dilated veins on the left side of the rectum, just within the anus. They could be quite readily withdrawn to the exterior, and, after careful cleansing with an antiseptic, under the influence of cocaine anæsthesia, a Chinese silk ligature was placed around the base. This was allowed to remain *in situ* for three days, when the removal was completed by excision. No untoward result occurred, and the patient has made an excellent recovery.

AN EXTREMELY BAD CASE OF PROLAPSE OF THE VAGINA AND RECTUM IN A HEIFER.—IS THIS AILMENT HEREDITARY?

By FREDERICK HOBDAY, F.R.C.V.S.
Kensington, W.

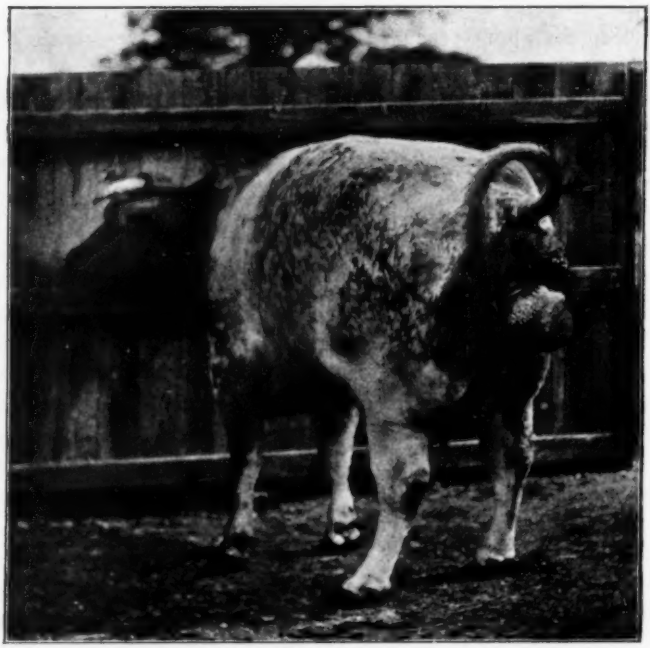
THE subject of the illustration was a very valuable Shorthorn, aged 4 years, one of the best of her breed.

Her history was as follows: She was in high condition and the first intimation of the ailment was a prolapse of the vagina, accompanied by straining, on August 2, 1906. Mr. Thomas Powell, M.R.C.V.S., who was called in, promptly returned it, but the prolapse returned three days later. When called in

consultation it was easy to see that the case was a very severe and serious one, the prolapse being of enormous size.

The rectal prolapse was returned after a good deal of trouble, but the vaginal protuberance was so excessive and so troublesome to manipulate (in fact, impossible to keep *in situ* even when reduced), that we decided to amputate.

This was done with the aid of ligatures, but the cow strained



An extremely bad case of prolapse of vagina and rectum.

so violently afterwards that the intestines were ejected through the vaginal orifice and, by mutual consent of my colleague and the owner, we decided that the kindest thing to do was to shoot the beast. A gun was fetched and the end was speedy and humane.

The remarks of the owner, who is a very observant man, in relation to the heredity of the condition, are interesting and worth serious consideration. In a recent letter he writes:—

"I have noticed that this complaint runs in families, and

we have had to dispose to the butcher the whole lot of this strain.

"We have also had others, but not nearly so bad, and I notice that they are also of a family which has been subject to the same thing. It has returned in the second and third generation; *i.e.*, the dam and the grand-dam have shown no signs, but has returned in their progeny and has been like the great grand-dam. Others have returned when the dam has been right.

"This may only be a coincidence not worth naming, but it is what I have observed, and I may say that I have also seen a bull from a cow kept for stock, where the cow has had the same prolapsus, and a few of his progeny on the female side have had the same thing."

I should like to hear whether any readers of THE VETERINARY JOURNAL have had instances of heredity of this serious ailment. It is well known that other herniæ are hereditary, and there is no reason why this should not come in the same category.

Canine and Feline Clinicals.

THREE CONSECUTIVE CASES OF PROLAPSUS ANI IN DOGS.

BY H. C. GANGULY, G.V.B.C.
Bengal Veterinary College, Calcutta.

PROLAPSE of the anus and rectum in animals, chiefly seen in this country in horses and oxen, is not of infrequent occurrence, although not often met with here in species of the canine tribe. This accident when recent can be readily combated by careful and skilful manipulation, but when the membranes become congested, abraded, swollen, and attended with eversion, it requires the application of warm fomentation, the medication with astringent lotion and in chronic cases an operation, to establish a complete cure.

The following cases are illustrative :—

Case 1.—On February 24, 1911, a white terrier pup of about two months old, belonging to a native gentleman, was taken into hospital for treatment of inversion of the rectum. The everted portion was about 5 in. in length ; it was insensitive to touch and was reported to have been noticed for the last four days. The animal was extremely exhausted there was excessive straining, the mucous

membrane was intensely congested, and slight infiltration and adhesion had taken place between the peritoneal surfaces.

Position.—The animal was secured on its right side and a mixture containing 10 gr. of potassium bromide dissolved in an ounce of water was administered to induce perfect quietness as well as to lessen needless straining.

Operation and Treatment.—The parts were carefully cleansed with Condy's fluid, applied as an antiseptic cold swab for nearly half an hour, and, with the aid of a gum elastic rod of about half an inch diameter lubricated with coco-nut oil, the adhesions were slowly detached with fingers, and the everted portion was gently returned by the aid of the fingers and the rod. The latter was then withdrawn, 10 oz. of about 2 c.c. solution of liquor opii sed. were injected into the rectum to bring on local anæsthesia as well as to induce sleep.

The animal afterwards was kept on laxative diet, there was no rise of temperature, the appetite was normal, and the animal recovered and was discharged cured on the eighth day.

Case 2.—On the evening of the 26th of the same month, another red terrier pup (bitch) belonging to a Mohammedan lady was admitted for the same complaint. It appeared to be in a very miserable condition.

Symptoms and History.—The animal was hidebound and dejected, and could hardly stand ; the coat was dull and the eyes were watery, whilst the rectum protruded for fully three inches. It was said to have been existing in a filthy, congested and swollen state for the last two-and-a-half days. The prolapse was reduced without any help of instruments, and dietetic precautions were adopted similarly as with Case 1. The animal recovered within a short period.

Case 3.—A black chow pup (dog) of about six weeks old, belonging to a European gentleman, was admitted on December 15, 1910, for, an attack of the enteric form of distemper. The animal during the course of its confinement here developed bloody dysenteric-diarrhœa, ran down extremely in condition, losing hairs in irregular bald patches all over the body. The eyes became very intolerant to light and the appetite more or less depraved. Towards the end of recovery from the attack inversion of about a foot of the rectum took took place as a result of excessive straining and constitutional weakness. It was reduced after the adoption of the similar procedures as are stated in the above two cases, and the animal recovered within a few days.

A SUPERNUMERARY SPLEEN IN A CAT.

By S. N. MITTER, G.B.V.C.

(From the Raymond Research Laboratory), Calcutta.

WHILE making an autopsy of a cat under suspicion of rabies in this laboratory, there was observed a supernumerary spleen occupying a portion of the right hypochondriac and epigastric region, just below the situation of the liver. It was kept in position by the peritoneal membrane of the stomach and was supplied by a supernumerary blood-vessel originating from the cœliac axis.

a *b*

(*a*) Natural spleen ; (*b*) supernumerary spleen.

The accompanying photograph shows both the spleens in their natural sizes.

INTERESTING OPERATION FOR INGUINAL HERNIA.

By HENRY TAYLOR, F.R.C.V.S.

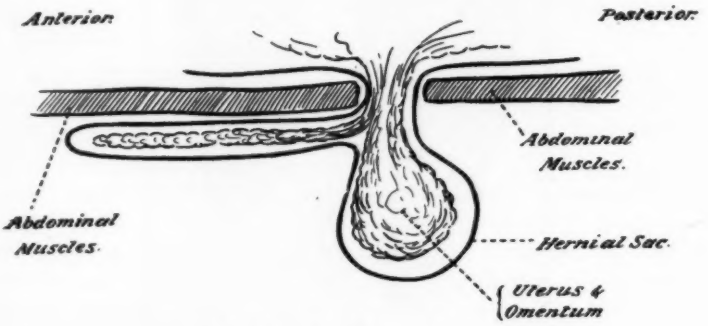
Haywards Heath, Sussex.

THE patient was a prize bitch, a winner of several prizes. About a month before the operation about to be described, she had been operated upon by Professor Hobday for inguinal hernia of the left side. This was completely successful, but shortly after a hernia developed on the opposite side, and as this undoubtedly gave her a

certain amount of pain, evidenced by the animal hardly ever lying down, whining and getting thinner day by day, it was decided to again subject her to an operation, though it was such a short time since the other.

The hernia was *apparently* only about the size of a nutmeg, and could not be reduced without an anæsthetic. The anæsthetic used was morphia, rather more than one grain being injected subcutaneously. From time to time where deep narcosis was required, whiffs of chloroform were given. Not anticipating much trouble, the skin for only a small distance around was rendered aseptic. This is interesting in the light of what happened.

The hernial sac was cut down upon, but the contents could not be completely returned, so after a considerable time the skin incision was enlarged, and the hernial sac was found to be of an unusual



Sketch showing hernial sac and contents.

shape—*i.e.*, it bifurcated after passing through the inguinal canal, one part lying almost behind it (the animal is taken as being in the standing position), the other passing directly forwards for about 3 in. The former was the part about the size of a nutmeg, the latter made a diffuse non-prominent swelling which was not thought to have any connection with it.

The contents were returned after some time, and a catgut ligature was tightly tied round the sac at its base. Just when preparations were being made to suture the skin as the completion of the operation, either the ligature slipped off the end of the stump or the sac, which may have been weakened by the continued manipulations, gave way, with the result that out came the uterus with a large

portion of omentum. The returning of these structures was no easy task, and as the omentum continued to well out, a large area of skin had to be hastily disinfected with fairly strong perchloride. Owing to the peritoneum having receded from the opening into the abdominal cavity, the reduction of the prolapsed organs was extremely difficult, and it was not until the expiry of three-quarters of an hour that this was successfully accomplished. During the whole of that lengthy period the uterus and omentum were being constantly handled and manipulated. In order to prevent any recurrence of the hernia, the ring was sutured with fine catgut, and the muscles surrounding the opening were strengthened by in and out sutures of the same material.

The bitch was sick a few times next day, but otherwise appeared very well considering what she had gone through. She continued to do well, showed no signs of peritonitis nor of suppuration in the wound, and although the stitches in the skin around came out leaving a rather large wound, the recovery otherwise was quite uneventful. The bitch is now quite fat and lively and in better spirits than she had been for some considerable time. Formerly she used to get attacks of pain about once a week ; now these have disappeared.

The case is interesting as showing how tolerant is the peritoneum of the dog if one only observes surgical cleanliness.

Abstracts.

ROYAL COMMISSION ON VIVISECTION.

ABSTRACT FROM THE FINAL REPORT.

(2) THE terms of reference were "to inquire into and report upon the practice of subjecting live animals to experiments, whether by vivisection or otherwise, and also to inquire into the law relating to that practice, and its administration; and to report whether any, and if so what, changes are desirable."

(4) The evidence which we have had before us has, we believe, informed us of every class of opinion interested in the terms of our reference. It includes that of representatives of the Government Departments which either administer the existing law or carry on researches under its provisions, of the principal scientific, physiological and medical bodies, and of the leading Universities in the United Kingdom, as well as of numerous private practitioners, medical and veterinary, and of representatives of the various anti-vivisection and humanitarian societies which have in

recent years occupied themselves with the protection of the interests of domestic and other animals.

(5) It has appeared to us convenient to divide the consideration of our Report in the following manner:—

After a brief account of the legislation and inquiries bearing upon the question of experiments on animals previous to the Act of 1876, we set forth with some particularity the provisions of the Act of 1876 and of the Home Office practice under the powers conferred by the Act for the purpose of carrying it out; we then proceed to examine the evidence as to the administration of the Act by the Home Office and deal with the specific charges made against that Department, and generally with the evidence as to alleged breaches of the Act.

But we have been further directed to report generally on the practice of experiments on animals, and we deal with this part of the subject under the following heads:—

(*a*) Recent history of the progress of medical science in connection with such experiments.

(*b*) Whether experiments on animals give valuable results in relation to the prevention and cure of disease and generally in physiological knowledge.

(*c*) How far immunity from pain in experiments is or can be secured.

(*d*) Whether, and how far, the objection taken by some that such experiments are morally wrong and unjustifiable can be sustained.

Lastly, we discuss some suggestions made to us, and submit the recommendations which arise out of our consideration of the above matters.

The Existing Law.

History of Legislation.

(6) The general law relating to cruelty to animals was, until this year, contained in Sections 2 and 18 of the Cruelty to Animals Act, 1849 (12 and 13 Vict., c. 92). These enactments authorized justices to fine up to £5, or to imprison for a term not exceeding three months, any person who "shall cruelly beat, ill-treat, over-drive, abuse or torture, or cause or procure to be cruelly beaten, ill-treated, over-driven, abused or tortured, any animal." The Act was originally confined to domestic animals (Section 29), but subsequent legislation enlarged the definition of "animals," and extended the protection of the Act to all animals in a state of captivity (17 and 18 Vict., c. 60, Section 3, and 63 and 64 Vict., c. 33). These enactments are now embodied in and somewhat extended by the "Protection of Animals Act, 1911." The construction of these enactments has sometimes given rise to difficulty, but the uniform tendency of the decisions is to confine their application to the unjustifiable or unnecessary infliction of pain.

The Act of 1876.

(9) The Act, "An Act to amend the Law relating to Cruelty

to Animals," applies to all vertebrate animals and to all experiments on them calculated to give pain. No such experiments may be performed except by a person licensed by the Secretary of State or in certain circumstances by a Judge of the High Court.

Experiments for the purpose of acquiring manual skill, and experiments by the way of public exhibition, are absolutely prohibited. Experiments by licensees "must be performed with a view to the advancement by new discovery of physiological knowledge, or of knowledge which will be useful for saving or prolonging life or alleviating suffering," or "for the purpose of testing a particular former discovery alleged to have been made for the advancement of such knowledge as last aforesaid, on such certificate being given as is in this Act mentioned that such testing is absolutely necessary for the effectual advancement of such knowledge."

The general or *primâ facie* restrictions on experiments "calculated to give pain" imposed by the Act are as follows:—

(1) The animal must, during the whole of the experiment, be under the influence of some anæsthetic of sufficient power to prevent the animal feeling pain, and

(2) The animal must, if the pain is likely to continue after the effect of the anæsthetic has ceased, or if any serious injury has been inflicted on the animal, be killed before it recovers from the effect of the anæsthetic which has been administered, and

(3) The experiment must not be performed as an illustration of lectures in medical schools, hospitals, colleges, or elsewhere, and

(4) The experiment must not be performed without anæsthetics on a dog or cat, or on a horse, ass, or mule.

All these restrictions may, however, be dispensed with by means of statutory certificates, that is to say:—

(1) A certificate may be given dispensing with anæsthetics on the ground that insensibility would frustrate the object of the experiment. (Certificate A.)

(2) A certificate may be given that killing the animal before it recovers from the anæsthetic would frustrate the object of the experiment, and such a certificate postpones the obligation to kill the animal until the object of the experiment has been obtained. (Certificate B.)

(3) A certificate may be given that the experiments are absolutely necessary for the due instruction of the students, and with such a certificate experiments may be performed before classes of students, but only under anæsthetics. If the animal is injured by the experiment, or would be likely to suffer pain after recovery to consciousness, it must be killed before the effect of the anæsthetic wears off. (Certificate C.)

(4) A certificate may be given which adds the testing of an alleged former discovery to the above-mentioned scientific objects which justify experiments under the Act. (Certificate D.)

(5) A certificate may be given that the object of the experiment would be frustrated unless performed on a dog or cat.

When it is proposed to perform the experiment without an anæsthetic Certificate E must be used, and it must be accompanied by Certificate A, which is to the effect that to produce insensibility of the animal by the use of an anæsthetic would frustrate the object of the experiment. When it is proposed to perform the experiment with an anæsthetic Certificate EE must be used, and it must be accompanied by Certificate B, which certifies that the purpose of the experiment would be frustrated if the animal were killed before it recovered from the anæsthetic. These certificates are not required when experiments on dogs or cats are performed under the licence alone. (Certificates E and EE).

(6) A certificate may be given that the object of the experiment would be frustrated unless it is performed on a horse, ass or mule, and such a certificate is necessary whether the experiment is performed under anæsthetics or not. (Certificate F.)

Licences.—Applications for licences must be signed by one or other of the thirteen* authorities specified in Section 11 of the Act, and also by a professor of physiology, medicine, anatomy, or surgery, unless the applicant is himself such a professor. The Secretary of State may grant a licence for such period and on such conditions, not inconsistent with the Act, as he thinks fit, and may, in his discretion, revoke any licences. The bulk of investigations require certificates as well as licences.

A Judge of the High Court also may grant a licence to perform experiments essential for the purposes of criminal justice.

Certificates.—Certificates enabling a licensee to dispense with certain of the statutory restrictions are given by any two, or, in the case of a University or College professor, any one of the persons holding the offices named in the Act, and may be given for such time or for such series of experiments as the signatories think expedient. Copies must be sent to the Secretary of State, and the certificates are not to come into operation until a week after the copies have been forwarded. A judge may give a certificate authorizing experiments essential for the purpose of criminal justice, and the Secretary of State may suspend or disallow any certificate except a judge's.

According to these provisions, therefore, a painful experiment under the Act may only be performed on the recommendation of one or more of the scientific authorities above referred to, and by a person holding a certificate granted by such authority sanctioning the experiment in question. Such certificates can only be granted to persons licensed by the Secretary of State.

Licences and certificates come up before the Home Office for

* The President of the Royal Society; the President of the Royal Society of Edinburgh; the President of the Royal Irish Academy; the Presidents of the Royal Colleges of Surgeons in London, Edinburgh, or Dublin; the Presidents of the Royal Colleges of Physicians in London, Edinburgh, or Dublin; the President of the General Medical Council; the President of the Faculty of Physicians and Surgeons of Glasgow; the President of the Royal College of Veterinary Surgeons, or the President of the Royal Veterinary College, London, but in the last two instances in the case only of an experiment to be performed under anæsthetics with a view to the advancement by new discovery of veterinary science.

consideration at the beginning of each year, but subject to any report by the Chief Inspector, licences are renewed, and certificates, if the experiments authorized by them have not been performed, are continued, without requiring the initial proceedings to be recommenced.

Registration.—All places where experiments are performed for class instruction require approval and registration by the Secretary of State, and he also may require the registration of any other places where experiments are performed under the Act.

Reports.—He may also direct any licensee to report to him the result of his experiment in such form as may be prescribed.

Inspection.—The Secretary of State may appoint inspectors, and he is directed to cause all registered places to be visited by inspectors from time to time, in order to secure compliance with the provisions of the Act.

Prosecutions.—If an experiment calculated to give pain be performed by an unlicensed person, any member of the public cognisant of the facts may institute a prosecution, except in Scotland, where the Procurator Fiscal alone can prosecute. If a licensed person contravenes the provisions of the Act he can only be prosecuted by a person who has obtained the assent in writing of the Secretary of State. Any such prosecution, however, must be instituted within six months of the occurrence of the alleged offence.

In Great Britain the Act is administered by the Secretary of State for the Home Department, while in Ireland the Chief Secretary to the Lord-Lieutenant is substituted for the Secretary of State.

Curare is not to be treated as an anæsthetic.

It is to be noted that the Act only applies to experiments for scientific purposes—that is to say, investigations made with the view of increasing or testing knowledge. It has been held not to apply to commercial operations, such as the production of vaccines or sera for purposes of sale. Nor does it apply to such operations on animals as are not in the nature of experiments, such as the castration of horses, lambs, &c. Any abuse in connection with such matters can be dealt with only under the general law of Cruelty to Animals.

Administration of the Act in Great Britain.

(11) The great majority of the experiments under the Act of 1876 are performed in Great Britain, and it therefore becomes material to consider the administration of the Act by the Home Secretary, who, as we have seen, is the authority for this country. The Home Office in administering the Statute have, under the powers conferred by the Act, added a number of departmental requirements.

The practice of the Home Office, we were informed, is as follows:—

In Great Britain every application for a licence and every certificate, when signed by the proper scientific authorities, is forwarded to the Home Office. It is then sent by the Home

Office to the Association for the Advancement of Medicine by Research for their opinion. If their observations are favourable, the licence or certificate is then submitted, together with the Report of the Association, to the Home Office Chief Inspector for his observations. It is his duty to report in detail on every certificate and every licence, and to advise on the special conditions, dealing for the most part with the protection of animals, which are therein inserted. For the purpose of enabling him to advise the Secretary of State, he makes, whenever necessary, such inquiries from the signatories and the investigator as may be in his opinion expedient, and in some instances he takes counsel of other persons having special knowledge of the subject. He then transmits the licence or certificate to the Home Office with his report, and they are both minutely examined departmentally. The examination is directed, firstly, to see that the requirements of the Act have been complied with, and secondly, to a comparison of the proposed investigation with previous researches, and to the decisions of the Secretary of State, if any, with regard to them. The qualifications of the experimenter are also considered. The papers are then submitted either to the Under Secretary of State or to an Assistant Under-Secretary of State, or to both. If the proposed investigation is of a novel or important character, or one which might involve the possibility of considerable pain, it is submitted to the Home Secretary personally. Generally speaking, all applications, coming as they do from and being recommended by competent persons, are granted. An absolute refusal is the very rarest occurrence.

The Home Secretary, in the exercise of his discretionary powers, inserts, in pursuance of Section 8, conditions which go considerably beyond the requirements of the Act itself. Under the Act a certificate has to be suspended for seven days, but in practice, as we now understand, it is not available until the licensee has been informed that it has not been disallowed by the Secretary of State.

According to Dr. Thane, Certificate A, "which dispenses with the use of anæsthetics has not," during the time as to which he can speak from personal knowledge, "been allowed for any operative procedure more severe that the opening of a subcutaneous vein for which no one would think of using an anæsthetic in man; that is, in other words, that vivisection of an animal, in the proper sense of the term, without anæsthetics has not in any case been allowed by the Secretary of State."

Certificate A is chiefly employed for inoculation experiments, of which there were 90,792 returned in the year 1910. Dr. Thane in that Return states: "The Certificate is in fact not required to cover" the operative procedures, "but to allow of the subsequent course of the experiment." A distinction must be drawn between "the operative procedure" and the "experiment," for the latter lasts during the whole time from the initial administration, injection or inoculation until the animal dies or is killed or recovers. The statement which appeared in the Returns for

the years 1889 and 1890 to the effect that: "No experiments requiring anything in the nature of a surgical operation or that would cause the infliction of an appreciable amount of pain are allowed to be performed without an anæsthetic" has been amended and since 1901 has appeared in the following form: "In no case has a cutting operation more severe than a superficial venesection been allowed to be performed without anæsthetics. . . . In no instance has a certificate dispensing with the use of anæsthetics been allowed for an experiment involving a serious operation."

The "pain condition," with which we deal hereafter in our Report, is inserted in all cases of Certificate A except "in cases where it was obvious that pain would not ensue from the procedures contemplated." It is as follows:—

"That if an animal, after and by reason of any of the said experiments under the said Certificates . . . if found to be in pain, which is either considerable in amount or is likely to endure, and if the main result of the experiment has been attained, the animal shall be immediately killed under anæsthetics."

In the case of Certificate B, when the animal is allowed to recover from an anæsthetic, anæsthesia is required to be kept up until the wound is closed and dressed, and aseptic precautions are required to be used when any cutting operation is resorted to, except when such precautions are inapplicable. The aseptic condition inserted in licences is as follows:—

"That the animals experimented on under Certificates . . . be treated with strict antiseptic precautions, and if these fail and pain results, that the animals be immediately killed under anæsthetics."

The forms of licences and certificates and the special conditions have already been given.

(14) *Inspectors.*—The Act does not define the duties of Inspectors further than directing (Section 10) that:—

"The Secretary of State shall cause all registered places to be from time to time inspected for the purpose of securing a compliance with the provisions of the Act."

But the requirements of the Home Secretary in this direction were explained to us by Dr. Thane, who added that he believed that no important step is taken in the administration of the Act without his being consulted. There are three Inspectors: one residing in London, who inspects all England and Wales except the six northern counties; and one in Scotland, who inspects the rest of Great Britain. The London Inspector reports direct to the Home Secretary; the Scottish Inspector reports to him through the London Inspector. The third Inspector inspects Ireland, and is under the control of and reports to the Chief Secretary to the Lord-Lieutenant. In the district of the London Inspector in 1910 there were 324 licensees and 48 registered places. In the northern district there were 218 licensees and 43 registered places. In Ireland there were 23 licensees and 15 registered places. The Inspectors are not required to give the whole of their time to the duties of their office.

The Inspectors visit each laboratory in their respective districts about three times a year, to ascertain whether they are properly kept, and whether the animals, especially those which have undergone operations, are properly cared for, and if they find any breach of the Act or requirements they either warn the licensees or report it to the Home Secretary according to the nature of the case. They all agree in stating that they find the animals well cared for and dealt with as required by the Act, and that they have no complaints to make in that regard. Much of the Inspectors' time is also consumed in correspondence and in advising on applications for licences or certificates; and they have to prepare an annual report to the Home Secretary.

In the course of their visits to the various places the Inspectors witness a certain number of operative experiments. In the six and a half years, from 1899 to 1905, Dr. Thane or his deputy saw 100 such operations. A very large number of animals under experiment though not under operations are seen by the inspectors in the course of their visits. It may be noted that in 1910-11 only about 2 per cent. of the experiments were performed under Certificate B, while about 95 per cent. were under Certificate A, the remainder being under other certificates, or under licence only.

Dr. Thane found the requirements in regard to anæsthesia strictly carried out and the experiments which he witnessed conducted as humanely as possible; he was satisfied with the treatment and care of the animals. Sir J. Russell had never encountered difficulty in inspection, but stated that licensees had great difficulty in understanding the Act and the certificates; anæsthetics were given freely and fully, but he had come across a few cases in which there was evident suffering following injection or inoculation. He did not believe that any licensee wilfully violated the Act.

Paragraphs 18 to 24 deal with adverse criticisms of the administration of the Act. These were carefully investigated and replied to by the conclusions in paragraphs 25 to 27, as follow:—

Conclusions.

(25) After careful consideration of the above cases we have come to the conclusion that the witnesses have either misapprehended or inaccurately described the facts of the experiments.

(26) So far as we can judge we believe that holders of licences and certificates, with rare exceptions, have endeavoured with loyalty and good faith to conform to the provisions of the law.

(27) We desire further to state that the harrowing descriptions and illustrations of operations inflicted on animals, which are freely circulated by post, advertisement or otherwise, are in many cases calculated to mislead the public, so far as they suggest that the animals in question were not under an anæsthetic. To represent that animals subjected to experiments in this country are wantonly tortured would, in our opinion, be absolutely false.

PROGRESS OF SCIENCE AND RESULTS OF EXPERIMENTS ON ANIMALS.

Conclusions.

(74) It will be apparent from the foregoing analysis (pars. 30 to 73) of the evidence brought before us that we have made full inquiry into the practice of subjecting live animals to experiments by vivisection and otherwise, as regards:—

(*a*) The recent progress of medical science; and

(*b*) The practical results that have been obtained.

We have received evidence from persons eminent in physiological, pathological, and sanitary science, who have testified to their belief that knowledge has been acquired in regard to the vital functions, the causes of diseases, and also in regard to means for their prevention and cure which, in their opinion, but for such experiments, could not have been acquired. We have, on the other hand, heard many witnesses, some of them having medical qualifications, who have disputed that valuable knowledge has been obtained by such experiments, maintaining that this knowledge has been erroneously attributed to such experiments, or who have contended that success has not attended the application of the knowledge to the preventive or curative treatment of disease.

Having regard to the witnesses who have appeared before us and to the evidence which we have received, there can be no doubt that the great preponderance of medical and scientific authority is against the opponents of vivisection. This is more markedly so now than was the case before the Royal Commission of 1875.

(75) On these questions, and apart altogether from the moral and ethical questions involved in the employment of experiments on living animals for scientific purposes, we are, after full consideration, led to think:—

(1) That certain results, claimed from time to time to have been proved by experiments upon living animals and alleged to have been beneficial in preventing or curing disease, have, on further investigation and experience, been found to be fallacious or useless.

(2) That, notwithstanding such failures, valuable knowledge has been acquired in regard to physiological processes and the causation of disease, and that useful methods for the prevention, cure and treatment of certain diseases have resulted from experimental investigations upon living animals.

(3) That, as far as we can judge, it is highly improbable that, without experiments made on animals, mankind would at the present time have been in possession of such knowledge.

(4) That, in so far as disease has been successfully prevented or its mortality reduced, suffering has been diminished in man and in lower animals.

(5) That there is ground for believing that similar methods of investigation if pursued in the future will be attended with similar results.

PAIN IN EXPERIMENTS ON ANIMALS.

(76) The third question that we proposed to consider at the commencement of our inquiry was:—

(*c*) How far immunity from pain in experiments on animals is or can be secured.

(77) Dr. Cushny, who is Professor of Pharmacology at University College, assured us that it is quite easy to administer anæsthetics to animals and thereby to secure complete immunity from pain; he preferred the use of general to local anæsthetics lest the animal should be frightened, and he mentioned urethane and paraldehyde as well as ether, chloroform, and A.C.E. mixture (composed of alcohol 1 part, chloroform 2 parts, and ether 3 parts) as suitable anæsthetics for animals, especially if given in large lethal doses. Professor Starling confirmed this view, and expressed the belief that all English physiologists intend to secure and do secure that experiments are so performed throughout as to prevent any infliction of pain. He employs morphia either as an adjunct to chloroform or sometimes alone as an anæsthetic. He said:—

"Though I have been engaged in the experimental pursuit of physiology for the last seventeen years, on no occasion have I ever seen pain inflicted in any experiment on a dog or cat, or, I might add, a rabbit, in a physiological laboratory in this country."

Not only in his opinion is this result secured by "the normal humanity" of the operator, but also by his desire to remove all other disturbing factors, of which he regards none as greater than that of pain. Professor Langley, of Cambridge, and most of the other physiologists who have appeared before us, have corroborated the views of Dr. Cushny and Professor Starling.

(79) There was some conflict of opinion as to the feasibility and the safety of administering anæsthetics to animals. Mr. Hobday, F.R.C.V.S., informed us that he had administered chloroform to many hundreds of animals, including dogs, cats, horses, cattle, lambs, and pigs, with very few fatalities. He is satisfied as to the practicability of inducing and maintaining a condition of complete insensibility to pain in animals by the administration of chloroform. Want of skill in administration was, in Mr. Hobday's opinion, responsible for the mortality which formerly attended the chloroforming of dogs. This may account for a view, which has been repeatedly urged, that it is more difficult to maintain anæsthesia by chloroform in a dog than in man and some other animals. Sir W. Thornley Stoker, Inspector under the Act for Ireland, entertained this opinion. Professor Schäfer had met with cases in which dogs took the anæsthetic badly or died while being put under, and he made a series of investigations on the action of chloroform and the way in which it kills. He suggested the use of atropin to counteract the inhibitory action of chloroform on the heart through the vagus nerve. We do not think there is any evidence to show that a condition of complete anæsthesia cannot be

obtained and maintained in dogs as in other animals, although liability to death under certain anæsthetics is somewhat greater in dogs than in men.

Dr. Thane has no doubt that morphia can be administered so as to cause complete anæsthesia in a dog, but it would probably require a fatal dose to do so.

Mr. Hobday considered that morphia affected different dogs differently; he did not use it for major surgical operations, as he considers chloroform a better anæsthetic; he has given large doses to dogs—as much as 20 gr.—without a fatal result, and considers them to be very insusceptible to a toxic dose of morphia. Morphia is also given by experimenters to animals as an adjunct to chloroform and ether.

Dr. Starling explained that it facilitates the induction of anæsthesia and prolongs it: "'So that with our rough methods of anæsthetization it is much safer.' 'If an animal has had a previous dose of morphia it will then go on with a small dose of A.C.E. mixture, instead of having to have a large dose constantly administered to it. That is the chief value of morphia.'"

Inoculations.

(85) We think that we may at this point usefully draw attention to the fact that the term "vivisection" is often applied to all experiments upon living animals. Such use of the term is liable to be misleading, as appears from the Returns published for the year 1910, which show that of the total number of experiments, 95,731, to which living animals were subjected, about 95 per cent. were "of the nature of simple inoculations, hypodermic injections, and similar proceedings performed without anæsthetics." The remaining 5 per cent. include the experiments involving cutting operations, and in more than half of these cases the animal was "required to be kept under the influence of an anæsthetic from before the beginning of the experiment until it was killed."

THE MORAL QUESTION.

(93) The fourth matter that we have to consider is:—

(*d*) Whether, and how far, the objection taken by some that such experiments are morally wrong and unjustifiable can be sustained.

We propose now to deal with this question, having at the same time some doubt whether we were invited by the order of reference to collect evidence or offer an opinion upon such a matter.

Conclusions.

(97) After full consideration, we are led to the conclusion that experiments upon animals, adequately safeguarded by law, faithfully administered, are morally justifiable and should not be prohibited by legislation.

As regards the different classes of animals used for experiments and the possibility of making discrimination

between them for such purpose, we are again confronted with a delicate question of relative ethics. Here again there can be little doubt that the general moral sense of civilized mankind would be prepared to make such differentiation, and would regard with quite a different degree of reprobation the like treatment for such purpose of one of the domesticated animals on the one hand with that of cold-blooded or indeed verminous or destructive animals on the other hand. The *differentia* in such case would probably be found to consist in the degree of association with or of affinity or utility to man.

We feel that recognition should be accorded to the reality and worthiness of such underlying sentiment which would secure a special reservation of animals coming within the aforesaid limits. Thus we think that the higher apes (anthropoid) and the dog and cat present claims for special consideration, and with these claims we deal adequately in our Report.

Summary of Recommendations.

(124) It now will be convenient to recapitulate briefly the various recommendations which we have made.

They are as follows:—

(1) An increase in the Inspectorate.

(2) Further limitations as regards the use of curare.

(3) Stricter provisions as to the definition and practice of pithing.

(4) Additional restrictions regulating the painless destruction of animals which show signs of suffering after experiment.

(5) A change in the method of selecting and in the constitution of the Advisory Body to the Secretary of State.

(6) Special records by experimenting in certain cases.

All Which we Humbly Submit for Your Majesty's Gracious Consideration.

The Report was signed by the following Commissioners:—

A. J. Ram, *Chairman.*
A. R. M. Lockwood (*subject to the reservations contained in the following memorandum*).
W. S. Church.
William J. Collins (*subject to the reservations contained in the following memorandum*).
J. McFadyean.
M. D. Chalmers.
W. H. Gaskell.
George Wilson (*subject to the reservations contained in the following memoranda*).

Clive Bigham, *Secretary.*
1st March, 1912.

Reservation Memoranda.

A Reservation Memorandum, signed by Colonel Lockwood, Sir W. J. Collins, and Dr. G. Wilson, is appended to the Report. It consists of eight pages, and is summed up in the following paragraph:—

(4) The two main points upon which we dissent from the Report are, firstly, as to securing by Statute that undivided responsibility of the Secretary of State which was recommended by the previous Royal Commission, but which the Act of 1876 failed to establish; and, secondly, as to placing a statutory requirement upon an experimenter painlessly to destroy an animal which has been experimented upon when obvious suffering has supervened. Both points lead up to and, in our opinion, necessitate amendments of the law.

Another Reservation Memorandum is appended and signed alone by Dr. G. Wilson. It consists of sixty-six pages, and is longer than the actual Report itself. Dr. Wilson's position is fairly well summarized by the following paragraph:—

While I deprecate the indiscriminate denunciation of those engaged in animal laboratory work as lacking in humanity and indifferent to animal suffering, I equally deprecate the charges of ignorance and indifference to human suffering which are sometimes hurled against those who are opposed to vivisection. Indeed, I venture to think that the only sane position which can be maintained in respect to these interminable controversies is this—that experiments on animals, no matter with what prospective gain to humanity, are repellent to the ethical sense, and that those who persistently advocate them as beneficial to human or animal life must justify their claims by results. That is the view which I hold. I am not an anti-vivisectionist, but I dislike vivisection or inoculation experiments; and I feel convinced that far more pain is inflicted in some inoculation experiments than in vivisection experiments under Certificate B, when the animal is allowed to recover. Moreover, I am always face to face with this distressing conviction that even admitting that experiments on animals have contributed to the relief of human suffering, such measure of relief is infinitesimal compared with the pain which has been inflicted on animals to secure it.

UNIVERSITY OF MELBOURNE.*

(*Abstract from the Veterinary School Prospectus.*)

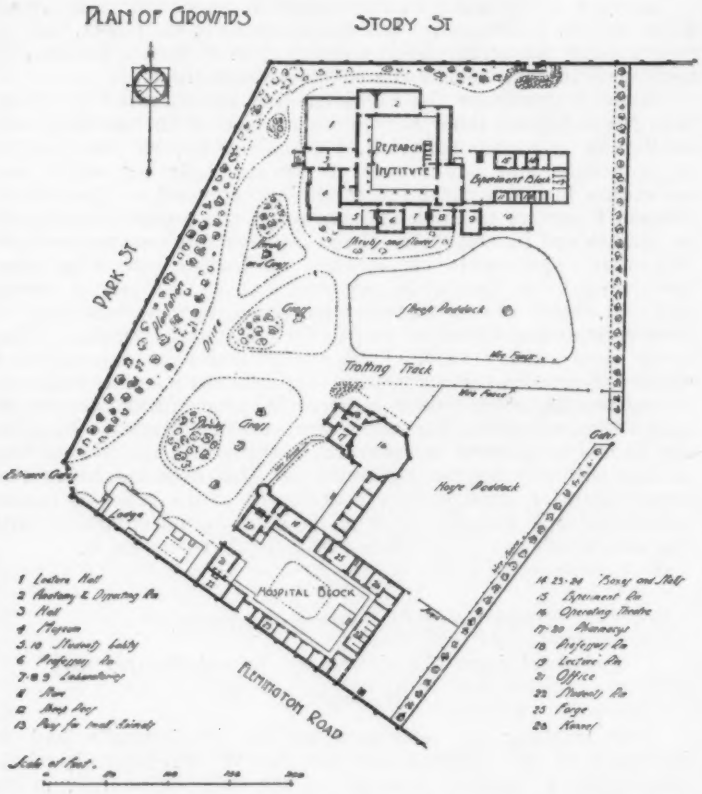
Historical.

The teaching of veterinary science in Australia had its inception in the establishment by Dr. W. T. Kendall, of the Melbourne Veterinary College, at Fitzroy, Melbourne, in the year 1888. The following year the Veterinary Surgeons Act was placed on the Statute Book of the Colony, and the new school was at once recognized as a teaching institution by the Board established under the provisions of that Act, which not only appointed the examiner, but controlled the curriculum, and granted the diplomas to successful candidates. Although entirely a private institution in that it received no support from

* A complete prospectus can be obtained upon application to the Secretary.

any public body, or funds, it is worthy of permanent record that it was the first Veterinary College in the world to establish a four years' course in veterinary science as a necessary qualification for a diploma.

UNIVERSITY VETERINARY SCHOOL AND RESEARCH INSTITUTE MELBOURNE



For many years it was obvious to those who were interested in veterinary training and veterinary science, that such an institution was deserving of very considerable public support, and that it should be placed on a permanent and satisfactory basis.

In 1906 a joint committee of representatives of the Government and of the University was established for the purpose of inquiring into the whole position, and as a result of its investiga-

tions, the Government agreed to provide the funds necessary for the erection and equipment of a thoroughly up-to-date veterinary school, with adequate endowment, and the University decided to establish degrees and diplomas in veterinary science, while Dr. Kendall generously accepted the proposal to transfer his own services and the students attending his College to the University. That the City of Melbourne was equally enthusiastic in its approval of the proposal was shown by the graceful and generous offer of a valuable and very convenient portion of land adjacent to the University as a site for the new Institution.

These various proposals received the sanction of Parliament early in 1909 by the enactment of the University Act 1909, and veterinary teaching in Australia entered on a new *régime* at the commencement of the University session of that year.

The Grounds.

Comprising four acres of valuable land, which was freely granted by the Melbourne City Council to the University for this special purpose, the grounds are bounded on three sides by broad public streets, and are surrounded by a handsome and solid brick wall. The main frontage is on Flemington Road, from which the land rises to a much higher level, facing Storey Street. The main entrance gates are at the corner of Flemington Road and Park Street, within three minutes' walk of Sydney Road tramway line, while a side entrance into Storey Street affords a shorter route to the main University buildings adjacent. Planted and laid out according to a design kindly prepared by Mr. W. R. Guilfoyle, late Director of the Botanical Gardens, Melbourne, they, together with the various buildings, present a fine appearance when viewed from the gateway.

The buildings comprise the research and anatomy block, the hospital quadrangle, and the Cuming operating theatre with surgical ward.

Research Institute.

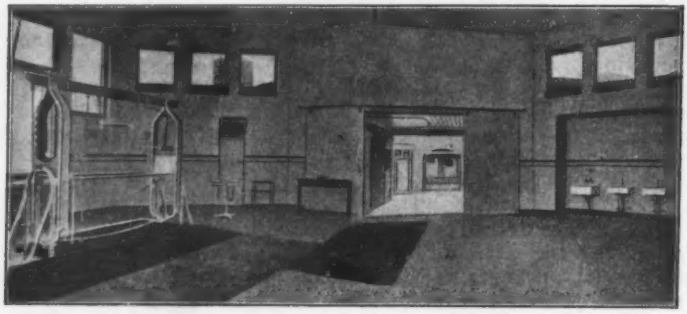
This consists of a handsome brick building designed on the modern renaissance style and fronts Park Street. On the left of the wide vestibule is the lecture theatre, capable of seating comfortably over 100 persons. Fitted in the most up-to-date manner, with lantern, screens, &c., it is also so arranged that by means of a special overhead rail, even the largest specimens may be transported thereto from the adjacent dissecting room for exhibition and class demonstrations.

To the right of the vestibule is the large museum and library, and behind this the photographic rooms. On the right of the quadrangle are the research laboratories, which, together with the students' pathological and bacteriological laboratory, form a wing extending backwards from the museum to almost the boundary wall. Next the museum is the laboratory for research students, or graduates undertaking special work. Beyond this are the Professor's room and research laboratories. On the

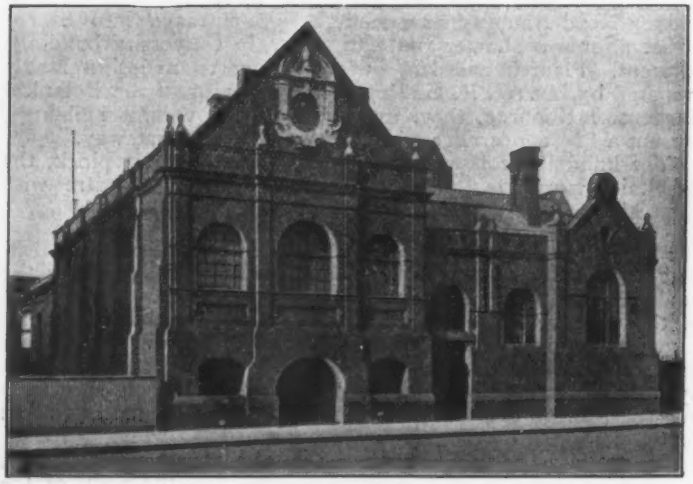
east side of the quadrangle, adjoining the research rooms, is the *post-mortem* room, spacious and well lit on all sides, where the cadaver may be examined with every facility, and demonstrations made thereon to students.

THE "CUMING" OPERATING THEATRE.

This handsome building, occupying the centre of the grounds,



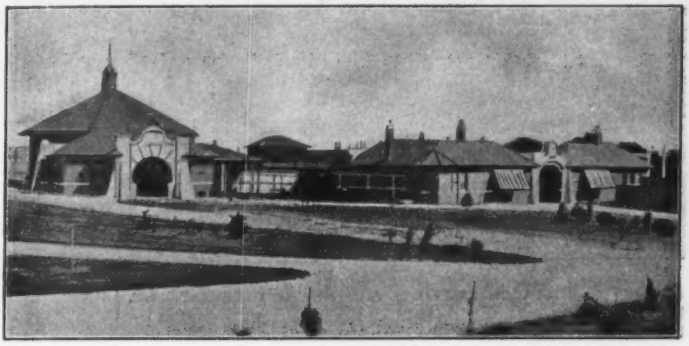
INTERIOR OF "CUMING" OPERATING THEATRE.



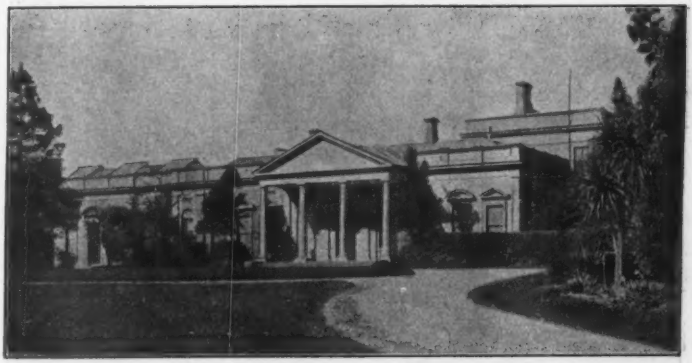
COLLEGE OF PHARMACY.

was erected by Mr. James Cuming, of Yarraville, in memory of his father, the late Mr. M. A. Cuming, of Ellon, Scotland, who was an able graduate of the Royal (Dick) Veterinary College, Edinburgh. Octagonal in shape, measuring 45 ft. in

diameter, it is constructed on modern principles, and thoroughly lighted on all sides. The floor is formed of tiles, laid on a concrete bed, and gradually slopes to one corner, so that thorough cleansing is rendered easy, while the walls are also tiles to a height of 6 ft. The theatre is fronted by a wide porch, leading into a passage, on the left of which is the instrument room, and on the right the Professor's private room. In a recess of the theatre are lavatory basins and sinks, fitted in the



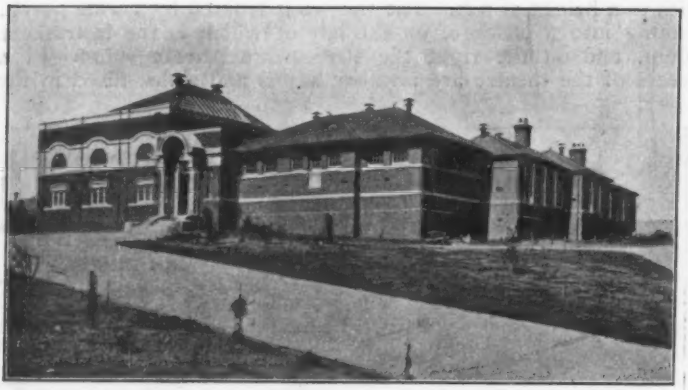
"CUMING" OPERATING THEATRE AND HOSPITAL.



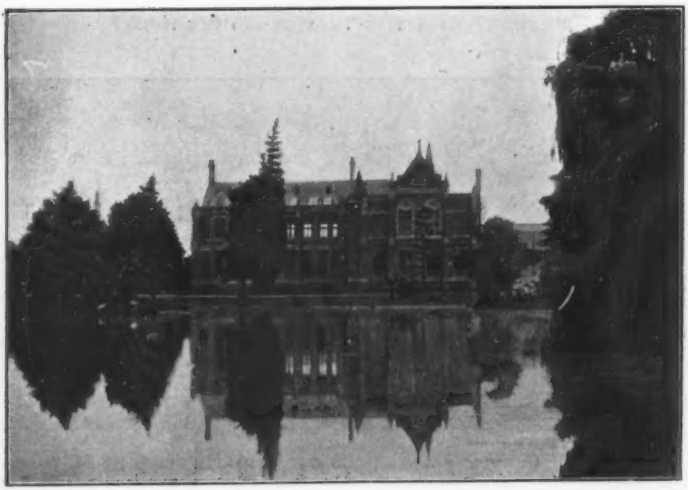
CHEMISTRY AND PHYSIOLOGY DEPARTMENTS.

most modern manner, and supplied with hot water from a special apparatus. At one side of the theatre is the large imported French "Travail bascule," or operating table, in which the largest horse may be operated upon with ease and safety. Attached to the theatre are special loose boxes for surgical cases, in front of which is a verandah-covered, paved, broad

passage, leading to the general hospital quadrangle. The area between these boxes, the operating theatre, and the hospital block is laid down as a lawn, on which horses may be operated



RESEARCH INSTITUTE AND ANATOMY DEPARTMENT.



BIOLOGY DEPARTMENT.

on under circumstances such as would prevail in the country, thus provision is made for operations being conducted under either the best artificial or the best natural conditions as may be desired for any particular case or demonstration.

The General Hospital.

This consists of continuous buildings, enclosing a large quadrangle, all asphalted, with the exception of the centre, which is laid down as a grass lawn. On the right of the archway is the office, the students' common-room, and the room for harness and other materials necessary for demonstrations on horse and stable management, behind which is a row of loose boxes. On the left is the pharmacy, thoroughly equipped with all the drugs necessary in veterinary practice, the private room of the lecturer on veterinary medicine, bathroom and lavatory, and small lecture room. Behind this is the horse bath, the forge, the pens for small animals, such as sheep and pigs, and the dog-kennels.

Practical Work.

The Institution, as is seen, provides every facility for housing sick animals of all descriptions. These are chiefly provided through a free clinic, which is established for the treatment of animals belonging to individuals who cannot afford to pay for the services of a private practitioner, but, in addition, cases are frequently sent by practitioners for special operations, &c. Besides these facilities, students become in rotation "internes" at a private veterinary hospital, the proprietor of which is accompanied by them in his rounds of visits.

Exhibitions.

Payne Exhibition.

The sum of at least £12 is available annually for competition among fourth-year students.

Caroline Kay Scholarship in Veterinary Anatomy.

This is of the annual value of £100, and is tenable for two years. The candidate must hold the degree or licence, and on appointment must act as demonstrator in anatomy during the tenure of scholarship.

In the first years of the degree course exhibitions in natural philosophy, chemistry, and biology are open for competition, and there is a number of research scholarships and prizes, which are available for veterinary students.

Medals.

A gold medal to be competed for by veterinary students has been offered by the Hon. the Minister for Agriculture (Hon. G. Graham).

Government Scholarships.

It has been arranged that the six Government free scholarships, awarded annually for the agriculture degree, may be available for students in veterinary science. It should be noted, however, that successful candidates who are desirous of entering for the degree are required to pass the usual entrance examination.

Fees.

The fees payable for veterinary courses are as follows:—

Bachelor of Veterinary Science:—

For Matriculation	£1	1	0
For the First Year	22	0	0
For the Second Year	25	0	0
For the Third Year	25	0	0
For the Fourth Year	25	0	0
For the Fifth Year	20	0	0
For the Licence and Degree... ...	7	7	0

Licence in Veterinary Science:—

For the First Year	£18	0	0
For the Second Year	25	0	0
For the Third Year	25	0	0
For the Fourth Year	25	0	0
For the Licence	5	5	0

Degrees and Licence.

The statutes enacted by the Council and Senate of the University, and approved by His Excellency the Governor, provide for two courses: One of four and a half years, leading to the degree of Bachelor of Veterinary Science, and ultimately to the degree of Doctor; the other of four years, leading to the Licence in Veterinary Science. The candidate for the degree is required to pass a preliminary examination similar to that required for the medical profession and for all veterinary schools in the United Kingdom (viz., Latin, English, arithmetic, algebra, geometry, and one of the following optional subjects: Greek, French, or German). A candidate for the licentiate is required to pass a preliminary examination of a lower standard in those subjects which are indispensable for an understanding of the work of the course, viz., English, arithmetic, algebra and geometry, and two other optional subjects. The licentiate also requires a less exacting scientific training during the first year, but during the other three years the work is exactly the same as for the degree. A student who has obtained the licence will be entitled to registration as a veterinary surgeon in Victoria. Nevertheless, an intending student is strongly advised to matriculate and enter for the degree. Not only will he find the scientific study much easier by virtue of the higher preliminary work, but it is considered more than probable that in future years successful candidates for official veterinary positions will require to be possessed of the degree.

Degree students may obtain the licence at the termination of the four years' study, and complete the attendance and work for the degree at a later date. Provision is made to enable the holder of a licence to obtain the degree by subsequently matriculating, making up the deficiency of first year's work, and completing the fifth year as required for the degree; but

candidates are warned that this is a much more difficult and less satisfactory manner of obtaining the degree.

The lectures of the course are open to all who pay the requisite fees, whether they have passed the required entrance examinations or not; but only those who are fully qualified can become candidates for degree or licence.

The statutes provide that graduates of the old Melbourne Veterinary College may be admitted to the University degree by undergoing a post-graduate course and passing a special examination on the subjects of the fourth and fifth years. Graduates of certain other veterinary schools, who have been resident in Australia or New Zealand for a year, are also given an opportunity of qualifying by examination or in certain circumstances by thesis.

Doctor of Veterinary Science.

Bachelors of Veterinary Science who have held the degree for two years may be admitted to the degree of Doctor either by special examination or by thesis acceptable to the Council of the University.

Subjects of Curriculum.

(For full details see University Calendar.)

First Year.

Natural Philosophy, Part I. (Veterinary Course).—During the first year candidates shall attend the full course of lectures and laboratory work, as prescribed for Natural Philosophy, Part I, and shall pass the examinations for the first two terms or an examination at the end of the year on the portion of the course covered during the first two terms.

The course in Natural Philosophy, Part I, is of an elementary nature, and includes lectures illustrated by experiments and laboratory work on the fundamental principles of the following subjects: Mechanics and hydrostatics; properties of matter; heat; light; electricity and magnetism.

Zoology.—The elements of vertebrate and invertebrate morphology, including the characters of the chief divisions of the animal kingdom, illustrated by reference to typical examples of each.

The structure, life-history, and functions of unicellular animals.

The more important points in the structure and life-history of the following parasites: Plasmodium, coccidium, distomum, tænia, ascaris, oxyuris, filaria, trichina.

Brief account of the structure of the crayfish and a typical insect. The life-history of flies and mosquitoes.

The more important points in the structure and development of branchiostoma.

The structure of the shark, with special reference to the circulatory and respiratory systems.

The structure, development, and life-history of the frog in detail.

The structure of the rabbit.

Outline of the development of the bird and of the fœtal membranes in mammalia.

Laboratory Work.—Examination by means of dissections and preparations of examples of the chief types dealt with in lectures.

Botany.—The lectures deal with fungi, bacteria, fermentation and setting, nitrogen fixation, crops, plant physiology, tillage and drainage, culture, breeding, hybridization, grafting, variation and evolution of plants, wood and fibre, weeds, and the general outlines of economic botany.

The laboratory work deals with the structure and production of bacteria and fungi, experiments in plant physiology, variation and resistance in seedlings, structure of tissues, and the reanimation and recognition of the principal plant products.

Chemistry.—Elementary chemical physics and inorganic chemistry. The laboratory work will include simple qualitative analysis and exercises to illustrate the principles discussed in the lectures.

Organic Chemistry.—The constitution and chemical relations of the chief hydrocarbons and their simpler derivatives containing halogens, oxygen, sulphur, and nitrogen.

Laboratory Work.—Simple exercise in volumetric analysis, including acidimetry and alkalimetry, oxidizing and reducing actions, &c.

Second Year.

Histology.—The course consists of lectures and demonstrations, extending over four terms, commencing the last term of the first year. During this course each student is required to mount and study microscopically, and make drawings of specimen typical of the following structures:—

General Histology of Mammals.—The cell (protoplasm, nucleus and mitosis); epithelia; connective tissues (areolar, white fibrous, elastic, adipose, reticular and lymphoid); cartilage and bone (including development); blood and blood-vessels and marrow; muscular tissues; nervous tissues (especially the neurone, with its peripheral terminations), nerve cord and brain (outline knowledge of medulla, cerebellum and cerebrum); lymphatic glands and lymphoid organs (tonsils, thymus and spleen); respiratory system; digestive tract (including tongue, development of teeth, salivary glands, liver and pancreas); skin and its appendages (sweat glands, sebaceous glands, nail, horn, hoof and hair); ductless glands (adrenal and thyroid); urinary system; male and female reproductive organs; sense organs (especially eye and ear).

Special Histology of Ruminants.—Modifications in the minute anatomy of the alimentary systems of ruminating animals will be demonstrated and studied microscopically.

Physiology.—Special Lectures on Systematic Physiology of the domestic animals are given. The earlier lectures are re-

stricted to Bio-chemistry, so that the practical classes on the same subject, taking place in the same year, may be better understood. Subsequent lectures deal with the physiology, general and comparative, of the blood, circulation, respiration, animal nutrition, metabolism, digestion, hormone and nerve, the peripheral nervous system, including the receptor mechanism of general and special senses, the central nervous system, muscle and locomotion, animal heat, renal and other excretions, reproduction, lactation, and the ductless glands.

The lectures are illustrated with experiments and demonstrations, and special emphasis is laid on subjects of special importance. The entire equipment of the laboratory (except instruments exclusively used in investigations on the human subject) is brought into requisition, and every effort made to secure objective treatment of the subject.

Practical classes in Biochemistry are held once a week in the first term, and twice a week in the second term. In these classes each student has the opportunity of studying experimentally the chemistry of the constituents of the animal body, of animal excreta, and the fundamental ingredients of fodders.

Equine Anatomy.—The lectures deal fully with the whole structure of the horse, including the skeleton, with articulations, ligaments, muscles, &c.; the digestive system, with its accessory organs; the respiratory system; the circulatory system; the nervous system and the organs of special sense; the generative system, and the urinary system.

During the year each student dissects the whole animal at least once under the immediate supervision of the demonstrator.

Comparative Anatomy of the Domesticated Animal.—This subject includes Embryology and the resemblances and differences in the structure of the various domesticated animals (the ox, camel, sheep, pig, dog, cat, fowl, &c.).

The lectures are illustrated by demonstrations, and dissections of the different domesticated animals are made by the students.

Third Year.

Pathology.—The lectures deal fully with the general characters of inflammation and its results; regeneration and healing of wounds; death of tissue; infiltrations and degenerations; hypertrophy and atrophy; new growths; cysts, &c.; while the morbid changes occurring in the different diseases affecting the various systems and organs are studied in detail.

The practical work comprises the macroscopic examination of diseased organs; the preparation of sections of tissues exhibiting the various pathological changes dealt with and their microscopic study; and *post-mortem* examinations.

Bacteriology.—The lectures and demonstrations deal with the classification, structure, isolation and cultivation of microbes; their toxins and anti-toxins; Vaccination and immunity.

Pharmacology for Veterinary Students.—This is a short course of lectures accompanied by lecture-demonstrations. The action of the following groups of drugs is dealt with: Drugs

acting on the Alimentary Canal; Anæsthetics; Hypnotics and Sedatives; Local Anæsthetics; Nerve Stimulants; Drugs acting on the Heart; Drugs acting on the Circulation; Antiseptics, &c.

The students have full opportunity of handling all the drugs dealt with in the lectures, and the action of the drugs are exhibited by full experiments wherever possible.

Agricultural Botany.—This subject is dealt with in lectures and demonstrations, including field excursions.

They comprise the classification and characters of plants generally, and their characteristics, both macroscopic and microscopic; the structure and classification of grasses and fodder plants, of noxious and poisonous plants, and of weeds.

Veterinary Hygiene.—The lectures deal exhaustively with air and ventilation; the site, structure, &c., of buildings used for the housing of different animals; abattoirs, dairies, dips, yards, &c.; drainage; care and feeding of animals; disinfection; State hygiene and legislation; quarantine, &c.

Practical demonstrations are given at stables, farms, abattoirs, markets, &c.

Veterinary Dietetics.—The lectures deal with the vegetable foods of animals, pasture, fodder crops, roots, grains and by-products; animal foods; their values, rations, &c.; also with water, its purity, storage, &c.

Parasitology.—The lectures deal with the classification of metazoon parasites of the domesticated animals, the chief distinguishing features of each group; the common genera in each; the more important points in their structure; the life history of typical species; and the principal parasites of the skin and internal organs.

The lectures are accompanied by demonstrations and laboratory work, during which the student is enabled to become familiar with the common parasites.

Fourth Year.

Pathology and Bacteriology of Infectious Diseases.—The lectures on this subject will be illustrated by demonstrations, while in the laboratory the student is afforded every opportunity of studying fully the various pathogenic bacteria and micro-parasites.

Veterinary Medicine.—The lectures deal with the various diseases affecting domesticated animals; their causes, symptoms, diagnosis, prognosis, medicinal treatment and nursing, prevention, &c. The lectures will be supplemented by daily clinical instruction and hospital practice, including dispensing, &c.

Veterinary Surgery.—The course embraces General Surgery and Regional Surgery. The practical course deals fully with minor and operative Surgery.

The lectures and demonstrations deal with sepsis, anti- and aseptic methods; the various wound infections; wounds, bruised, lacerated, contused, penetrating and perforating, and those produced by various forms of firearms; sinuses, and fistulæ; ulceration, gangrene, hæmatoma, abscesses, burns, frost-bite,

&c.; hæmostasis, aneurism, embolism, bone diseases, fractures, dislocations anchylosis, paralysis, joint diseases, tendon and muscle injuries, lamenesses, tumours, simple and malignant.

The surgical conditions of the teeth, mouth, nose, eye, trachea, larynx, pharynx, œsophagus, thorax and abdomen are fully treated and as far as possible actually demonstrated.

Veterinary Obstetrics.—The lectures deal thoroughly with pregnancy, and gestation, and the various conditions met with in maternal and in fœtal dystokia. The lectures will be illustrated by demonstrations and practical work.

Meat Inspection.—This course is conducted at the City Abattoirs, where lectures and demonstrations are given at least once a week on all the phases of the subject.

Stable Management and the Principles and Practice of Shoeing.—These subjects are dealt with by series of special lecture demonstrations during both the third and fourth years.

Fifth Year.

Advanced Pathology and Bacteriology.—The lectures deal principally with tropical and exotic diseases, their causes, and the morbid processes encountered; also with the production of toxins, anti-toxins; and the more detailed employment of bacteriological methods in diagnosis. The lectures will be supplemented with special laboratory work.

Epizootic Diseases.—The lectures deal chiefly with the symptoms and treatment of the tropical and other exotic diseases of animals.

Operative Surgery.—The lectures and demonstrations deal with the more difficult and unusual operations in veterinary surgery, and will be supplementary to those of the fourth year.

State and Municipal Sanitary Science.—The lectures will be chiefly explanatory of the various legislative enactments in various States dealing with the control of animals in health and disease.

Vegetable Pathology.—A course of lectures with demonstrations will be given on the commoner diseases of plants, especially those affecting fodder plants.

Entomology.—A course of lectures, with demonstrations, will be given, dealing with the insects inimical to domesticated animals, and will be supplementary to the course on parasitology.

Reviews.

"The Economics of Feeding Horses," by H. A. Woodruff, M.R.C.V.S., Professor of Veterinary Medicine, Royal Veterinary College, London. Crown 8vo. Pp. x and 117. Published by Messrs. Baillière, Tindall and Cox, London. Price 3s. 6d. net.

As the author of this useful little book points out in his preface, the problem of feeding horses so as to secure a maximum of efficiency at the minimum cost is a very urgent one, especially so in these days of competition between horse traction and motor traction. Hence the object of the work is to explain the principles of feeding, and to show how those principles can be put into practice with economic advantage. It is written for the use of veterinary surgeons, for horse owners and managers of studs, to all of whom the subject is of the greatest importance, while it will also be of considerable assistance to veterinary students preparing for their examination in veterinary hygiene, of which subject dietetics forms a prominent part.

The first five chapters, then, deal mainly with principles such as the chemical composition of foods, digestion and digestibility, nutritive value of foods, maintenance and working requirements. The following chapters are more practical, and deal with suitable rations, substitutional dieting, and the comparative cost of various foods, preparation of food, and the feeding of sick horses. The last chapter alone would make the work of exceptional value and worth many times the cost price of the book. It consists mainly of tables showing at a glance the comparative values of various foodstuffs from different standpoints. For example, Table VI shows the work-producing value of one pound of any common food, such as oats, maize, beans, &c., compared with the same amount of any of the others, while Table VII shows the relative market prices of various foodstuffs at which they provide equal nutritive values. Table VIII is useful in determining the cost of a ration. It shows the cost of 1 lb. of various foods when the price per quarter is known.

The book is not easy reading. It is too full of hard facts, which will require to be read and re-read for the reader to fully grasp their great importance. But when the principles of the subject are fully mastered, then the tables at the conclusion will be found to be of the greatest possible assistance in the economical feeding of any stud of horses.

G. H. W.

American Veterinary Review, March, 1912.

THE periodical of the above date, edited by Professor A. Liautard, M.D., V.M., and Dr. Robert W. Ellis, D.V.S., with many American collaborators, quite keeps up its reputation as one of the foremost American veterinary publications. One of the editorials treats of the puncture of the sphenoidal sinus

as a remedy in amaurosis, and another of urinary pouches occurring chiefly in ruminants. There are articles on "The Pathology of Roup and Chicken Pox," showing them to be two quite distinct diseases, and both transmissible by inoculation; a treatise on "Handling a Wholesome Milk," revealing what is done to improve the supply in the State of Pennsylvania; besides contributions on "Arsenical Poisoning from Smelter Smoke," "Anthrax and Tick Fever," "A Winter Disease: Scratches, Mud Fever, Snow Poisoning," "Canine Rabies," "Necrobacillosis in Sheep," and a communication on "Wound Healing," by A. T. Kinsley. This author expresses the opinion that "it is certainly no credit to a veterinarian to have under his care several cases of wound healing in which the method of healing is by granulation." We certainly agree with him to some extent, but how a busy practitioner could have many wounds irrigated for four or five hours with physiological salt solution after application of a disinfectant—a procedure which he seems to suggest—is hard for us to comprehend. The clinical articles comprise three—one on "Hypospadias in a Ram," another on "A Polycellular Cyst," and the third on "Dislocation of the Femur." The articles are illustrated. There are several abstracts from English, French, Belgian, and German exchanges, and a few pages devoted to Army veterinary matters.

G. H. W.

L'Hygiène de la Viande et du Lait.

THIS journal, which now has a somewhat similar counterpart in England, is well up to the standard for the month of March. There are articles on "The Pasteurization and Sterilization of Milk," on marking animals so that their origin may easily be identified after sale, a report on the researches into green putrefaction, and a contribution dealing with the composition, analysis, and preparation of pork-butchers' produce. The contents of the journal, and the fact that it has such a good circulation in France, show that hygienic and inspection matters in connection with meat and milk are far more advanced and thoroughly appreciated in that country than in this.

Study of the Bacillus erysipelatis suis (Rhusiopathia suum). A monograph founded on practical experience by H. Thum, Veterinary Surgeon of Köfering.

Annexed B. A. I.

The history of swine erysipelas is traced by Thum from the year 1857, when it was supposed to be anthrax, on through the year 1882 when Eggeling differentiated some diseases of swine into (1) sporadic head erysipelas, (2) sporadic nettle fever (Backsteinblattern), (3) infectious erysipelas, (4) Schweineseuche (no longer the severest form of septicæmic erysipelas), down to

1885, when Kitt discovered the real bacillus of this disease (*Bacillus rhusiopathiæ suis*).

The cause of the disease is a bacterium which in preparations from the animal body is shown as an extremely thin, generally straight, more rarely slightly bent, rod 1-1½ microns long. It stains easily with aniline dyes, has no flagellæ and forms no spores. It grows in neutral or alkaline nourishing fluid media, better if anaerobic than aerobic; the characteristic of its growth is the so-called bottle brush form if one makes a stab with virulent material in nutrient gelatine and leaves it standing at room temperature and protected from light. It is very resistant to external influences. Stadie (Inaug. Diss., Berlin, 1904) stated from his experiments that the bacillus of erysipelas would withstand 2½ hours' cooking in the flesh of a cadaver and that it was only slowly killed by sodium chloride. In pieces of flesh 2½ lb. in weight, the bacillus is only killed in two weeks after slow, continuous smoking.

This shows that it is most suitable to render the cadaver non-injurious by a high degree of heat and that only thus complete security by the death of the bacillus is obtainable.

Several instances are given of infection of man by the bacillus. Mayer, in 1899, in a medical paper, writes: "Like water imbibed by blotting-paper, quite faded, without sharp boundaries, the inflammation extends; it attacks a finger unexpectedly to-day which appeared free from disease yesterday and leaves parts of the skin apparently free and unaltered, in order to re-occur again at its edges on that side."

Swine, 3 to 12 months old, show great susceptibility to erysipelas infection; animals under 3 months and over a year are more resistant; yet it has been noted that older animals breeding sows and boars have been frequently attacked and, without specific treatment, an acute attack, ending in death, has developed. Natural infection occurs by the digestive tract and possibly also by the respiratory organs. Authors differ in opinion as to whether the external skin also forms a port of entry.

The bacillus occurs as a saprophyte in heavy, damp, clayey soil, and slowly flowing water; summer months with high temperatures are favourable to the development of the infectious material. The contagium is always fixed; transmission through the air is quite excluded.

Nettle fever (Backsteinblättern) is the mildest form of swine erysipelas.

Clinical diagnosis is based on the examination of rectal temperature, and I consider temperatures of over 41° C. in swine, together with great prostration, extreme weakness in the hind parts and constipation as suspicious. I soon decide, if, as rather frequently happens, redness of the skin occurs. This, in my experience, appears on the second day of the illness, very seldom earlier, many a time immediately ante-exitum. I do not wait until this skin redness appears before employing the specific treatment.

A further form of erysipelas is the so-called chronic variety

which declares itself by heart disease (*Endocarditis valvularis verrucosa*).

Judging from literature this form of swine erysipelas with endocarditis, without occurrence of acute disease, is the only one noticed in England. [English observers have recently commenced to give more attention to this disease and all forms of the ailment are now being noted.—*Translator.*] To the chronic forms of erysipelas a specific arthritis belongs, which I have not hitherto had the opportunity of noticing.

Microscopic diagnosis may be made from blood extracted from the ear vein and pigeons may be experimentally infected.

The most interesting method of protective inoculation to us in Germany is sero-vaccination, according to Dr. Lorenz, of Darmstadt. This differs from Leclainche's method in that the erysipelas serum is not mixed with culture, but the serum and culture separated from one another are injected at different parts of the body at distinct intervals of time or at the same time.

The inoculations must also be undertaken separately, also where a curative effect is desired. A distinction, however, must be made in those cases where all the swine have been inoculated and recover, then cultures only need be injected; however, the culture injection should not be made earlier than ten to fourteen days after the serum injection.

The second kind of sero-vaccination, the simultaneous method, *i.e.*, mixed serum and culture, is used as a protective or precautionary inoculation in absolutely healthy swine and in styes where there is no suspicion whatever of erysipelas infection.

My protective inoculations with "suiserin," manufactured by Meister Lucius and Brüning, Höchst a./Main, number many thousands.

The doses given for swine cannot be exactly carried out in practice, as their employment necessitates practice in guessing the weight of the swine by the inoculator, and as a fact I have usually injected more than the quantities prescribed.

"Suiserin" is not only an efficient protective, but also a very reliable curative agent. I recollect especially one case (out of many where I have used it successfully) where a breeding sow was very ill and almost the whole surface of the body was bluish red, she could not rise, had to be dragged out of the stall, but after five consecutive days' injections of about a total quantity of 70 c.c. of suiserin she completely recovered and brought up several litters afterwards. The quickest method of procuring immunity is by intravenous injection which, according to Holterbach, is established in 10 to 15 minutes. Subcutaneous injection, after the lapse of the fifth hour, produces gradual immunity.

Where swine fever and Schweineseuche exist in the same subject the serum causes no exacerbation of the latter complaint, but cultures injected cause both Schweineseuche and hog cholera to assume an acute form.

As inoculation methods we must choose those of which we know that they (1) Immediately after injection confer immunity

on the inoculated ones. We desire further: (2) That this immunity may be continued optionally long enough according to the wish of the customer. (3) That it may be just as well carried out in swine of different ages, whether the animals are to be fattened or bred from. (4) That it may be used without danger as well for inoculated swine as therapeutically for non-inoculated swine. (5) That the method be not too dear.

Recent experiences with Lorenz's serum shows that it fulfils all these requirements.

Serum injections alone confer passive immunity for three to five weeks. Cultures lengthen the immunity period to five to six months, and by subsequent injections of larger doses of culture active immunity may be made to continue for a year.

G. M.

Translations.

THREE CASES OF FATAL THROAT LESIONS IN THE DOG.

By Professors G. PETIT and R. GERMAIN
(Translated by I. S. C.)

(1) *Papillomatous Laryngotracheitis.*—A bulldog was attacked by broncho-pneumonia after distemper. A chronic discharge from the nose continued for two years. Difficulty of breathing and suffocation followed, ingestion with rejection of food. So far as could be observed by oral examination, the pharynx contained a large quantity of muco-pus, appearing to come from behind the soft palate. The patient died suddenly, asphyxiated while feeding.

Apart from the asphyxiation, the lesions were limited to the mucous membrane of the larynx and of the upper part of the trachea. The affected regions were greatly congested and swollen, and were covered with muco-pus. The entrance to the larynx was almost entirely obstructed by a little spherical tumour, about as large as a grain of maize, emerging from the right ventricle of the glottis, at the bottom of which it was attached. Papillomatous growths were also found on the surface of the right vocal cord. The left vocal cord was studded with little warty excrescences, without much swelling.

The histological examination showed that the pathological changes above the vocal cords were due to a diffuse and acute inflammation, and, that, at the level of the points where the covering membrane is normally stratified, this inflammation, having been perhaps established there longer, was rather characterized by a proliferation of the diseased membrane and culminated in papillomatous formations which were bound to cause death.

(2) *Fatal Phlegmonous Laryngo-tracheitis.*—An old dog

exhibited intense dyspnœa with threatenings of asphyxiation; his attitude was like that of an animal suffering from diaphragmatic hernia. The throat was extremely sensitive; pressure provoked a spasm with difficult whistling cough, followed by muco-purulent expectorations. Death occurred suddenly.

The lesions notified at the autopsy were the changes of a phlegmonous tracheitis causing the almost complete obstruction of the passage. The mucous membrane of the larynx and of the upper part of the trachea was inflamed, thickened, and infiltrated with pus. A large abscess had attacked the right vocal cord. The necrosed cricoid cartilage was intersected with exudate. On the left, between the three first rings of the trachea, the upper part of the tumefied partition had pushed back the mucous membrane, partially occluding the canal. Two suppurating wounds, resulting from the bite of a dog, were observed on the back of the neck and on the right cheek.

(3) *Peri-œsophageal Tumour-like Swelling pushing back and Obstructing the Trachea.*—In a dog the right jugular region was attacked by an ill-defined tumefaction, in connection with which there was a fistula, ending in a subcutaneous *cul-de-sac*. Respiration was difficult, and swallowing nearly impossible.

The autopsy revealed the presence of a chronic swelling, consisting of fibro-lardaceous tissue infiltrated with reddish pus. It had implicated internally the œsophagus, the trachea, and the right thyroid body. The infection had begun in the œsophagus, the mucous membrane of which was inflamed and shrivelled and showed a little longitudinal ulceration. The trachea was extensively pressed back at its postero-superior surface, and was nearly choked up by a large growth, which pressed down the cartilage and compressed the mucous membrane.

CONTAGIOUS FEBRILE LARYNGITIS OF HORSES.

By BABOR.

Since 1888 several authors (Zorn, Joly) have described the existence of an infectious laryngitis. Meyer, Hutyra, and Marek ascribe it to influenza, but until more fully confirmed the author considers it as a distinct morbid entity. This laryngitis chiefly attacks young horses, and manifests itself by a hoarse cough. It is accompanied by a rise in temperature up to 40° C., which does not persist more than forty-eight hours, and betrays its presence by an abnormal sensibility of the larynx. Discharge is trifling, conjunctiva preserves a normal colour, and bronchitic *râles* are exceptional. There is no appetite. In the majority of cases the affection is benign, and lasts eight to fifteen days. Naturally, complications of bronchitis or pneumonia are always possible. The contagiousness of the complaint enables it to be differentiated from sporadic laryngitis. Isolation and hygienic measures suffice to conquer the epidemic. Fresh-air treatment is particularly recommended. — *Oesterreichische tierärzt. Woch.*

POISONING OF A HERD OF CATTLE BY COLCHICUM AUTUMNALE.

Indexed B. A. I.

By BARRAT and REMLINGER.

Of a total herd of fifty-one cattle, thirty-one suddenly fell ill and five died. The animals severely affected showed extreme depression; they lay down constantly, and the standing posture maintained with difficulty. Falling away in condition was very perceptible in a few hours. There was no appetite, and rumination suspended. A profuse blackish-green diarrhœa was present. Saliva abundantly secreted. Respiration and pulse were slowed down. Temperature, 37.8° C. Animals slightly affected (more especially calves sucking their mothers) simply exhibited dejection, lessened appetite, dryness of the muzzle, and slight diarrhœa. The lesions observed at the autopsy of the sick animals that died showed acute gastro-intestinal inflammation with biliary hypersecretion.

The accident was ascribed to an intoxication produced by ingestion of *Colchicum autumnale*.

Treatment consisted in drenching with milk, with the addition of white of egg and black coffee. Injections of caffeine and external applications of mustard completed the therapy.—*Revue Gén. Méd. Vét.*

DENTAL FISTULA IN THE HORSE.

By Professor A. W. MÄRKEBERG.

A fistula which leads to the root or cavity of a tooth, and is accompanied by an inflammatory process in the dental or pulp cavity, is known as a dental fistula. Most frequently it is the result of inflammatory processes which have extended from an alveolus to the bony tissue. In a purulent alveolar periostitis, or, as it was formerly known, caries of the dental cavity, infectious material could encroach on to the osseous tissue and give rise to the production of a necrosis, as well as a purulent rarefying ostitis and osteomyelitis. Through this a portion of the bony tissue dissolves; an ossifying periostitis arises on the outside of the jaw, often accompanied by a significant thickening of the jaw-bone. Later, from the effect of suppuration, the new formed bone tissue dissolves again and breaks out through the skin or mucous membrane. After bursting of the abscess the resulting opening does not close. Then the inflammatory process is sustained by the diseased tooth cavity, and the consequent result is a fistula. Also in caries of a tooth in which the pulp cavity is opened, the inflammatory process can extend through this on to the bony tissue and into the alveolus. In very old horses, by simple attrition, an opening may arise leading to the depth of the tooth cavity through the middle portion of the crown, and through the opening an inflammatory process may develop, leading to dental fistula. In this way dental fistulæ in the upper jaw generally arise; they lead, if they implicate the molars, in the majority of cases, to one of

the cavities of the jaw; on the contrary, if they affect the incisors, into the nasal cavity. Fistulæ of the teeth of the upper jaw often make an exit through the skin. In addition injuries and inflammatory processes, which extend from without on to the previously healthy alveolus, can occasion dental fistulæ, as well as after injury of the lower jaw, with subsequent necrosis in the branches of the jaw. The decay in the bone tissue may spread to the alveolus and open this, so that the root of the tooth lies exposed; the inflammation in the alveolus, however, extends no further, as a rule, and during its course it often leads to deposition of bony tissue at the root of the tooth (exostosis). This is of importance in treatment. Dental fistulæ of the back teeth of the lower jaw do not always arise in this way. They may also be occasioned by a primary alveolar periostitis. If necrosis or caries in the rami occurs in front of the back teeth without opening of the alveolar cavity to fistula formation, it is spoken of as a false dental, or jaw, fistula.

Diagnosis is not difficult as a rule. If a dental fistula leads into the molar or maxillary sinus, then the usual inflammatory symptoms (empyema) are noticed in the cavity. If one finds near by an alveolar periostitis in the corresponding tooth, or a defect is established there, then the diagnosis is all the more certain. Dental fistulæ which lead from the anterior molars (premolars) to the nasal cavity may be recognized by a chronic nasal discharge, in which particles of food may be seen, and by a thickening of the external surface of the jaw-bone. If the dental fistula leads into the inferior meatus a chronic inflammatory process arises. As a result severe swelling occurs, accompanied by stenosis of the nasal cavity and a chronic nasal discharge. On this account in swelling of the inferior meatus a minute examination of the premolars ought never to be omitted.

Prognosis, as a rule, is good. In dental fistulæ which arise as a result of primary disease of the alveolus, the removal of the tooth is always indicated. This is also very frequently the case if the dental fistulæ arise in other ways. Yet in dental fistulæ which arise from outside sources, and in which the alveolus is only affected slightly, it is possible that the root of the tooth may be completely covered with granulations, and the fistula be healed. In such cases healing must be sought to be produced without removal of the tooth. After the horse has been cast and narcotized, the skin round the mouth of the fistula is shaved and disinfected. Then the soft parts are incised and the fistulous openings in the bone exposed. The periosteum is dissected back and the jaw bone trephined or chiselled out, and the alveolus exposed as far as it is diseased. The root of the tooth, laid bare, is carefully cleansed, the jaw disinfected, and the cavity punched or trephined in the bone, tamponed with iodoform gauze. In favourable cases the root of the tooth may in this way be covered with granulations, and the defect in the jaw-bone be filled in. Chiselling out or trephining is preferable to the use of the hot iron or corrosive means. Even if doubt exists as to whether a real or false dental fistula is under treatment, chiselling is advisable, since this method of treatment is generally recom-

mended in the latter case. If this procedure fails, or it happens that the pulp cavity of the tooth is extensively diseased, then the tooth must be extracted or punched out.—*Deutsche tierärzt. Woch.*

THE TREATMENT OF PARALYTIC HÆMOGLOBINURIA.

Indexed B. A. U

By A. INCHAURREGUI and D. BLASI.

The treatment which the authors recommend, and which for fifteen years has given them the best results, differs from the classic treatment—bleeding, catheterization of the bladder, administration of laxatives, diuretics, cooling dietary, hypodermic injections of ergotin when hæmoglobinuria is abundant—by the administration of bicarbonate of soda in very large doses, and by refrigeration of the lumbar region. Bicarbonate of soda is given the first day in a dose of 600 to 1,000 grm. (18 oz. to 2 lb.) in electuary or as a drink; the following days the quantity is progressively diminished to 100 grm. Refrigeration of the lumbar region is obtained by means of continuous irrigation with cold water, or by a towel frequently soaked. During convalescence iodised and arsenical preparations are given with a view to warding off paralysis of the femoral nerve.—*Revista e Medicina veterinaria.*

Letters and Communications, &c.

Mr. Maxwell Edgar; Dr. Frank Attwood; Mr. Eaglesham; Mr. A. E. Willett; Mr. Guy Sutton; Mr. Watson; Mr. T. Goodall; Mr. T. B. Goodall; Mr. G. Mayall; Mr. J. Willett; Mr. G. Heslop; Dr. Stapley; Mr. H. C. Ganguly; Mr. S. Mitter; Mr. H. Taylor.

Books and Periodicals, &c., Received.

Journal of the Royal Army Medical Corps; Recueil de Médecine Vétérinaire; L'Hygiène de la Viande et du Lait; Revue Générale de Médecine Vétérinaire; Der Tierarzt; Zeitschrift für Veterinärkunde; Berliner tierärztliche Wochenschrift; Osterreichische Wochenschrift für Tierheilkunde; La Clinica Veterinaria; Revista de Medicina Veterinaria; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland; Kennel Gazette; Agricultural Journals for the Union of South Africa and for Rhodesia.

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